Chapter 22
The Houses of Ṣan'ā'

Introduction

Yemeni towns are usually concentrations of high houses, slightly more sophisticated in structure and decoration than rural houses, but in most respects quite like them. From a fairly dense centre, the houses spread out to merge into the scattered tower-house farms at the edge of the town. In the old city of Ṣan'ā', the presence of a surrounding wall produced a fairly sharp demarcation between city and country. The ease with which extensions to the area of the city were provided westward by building new walls, whenever these were necessary, suggests that congestion was not a primary factor in the upward growth of the houses.

The characteristic type of house in Ṣan'ā' is a tall, square, tower house with an entertaining room or rooms at the top (pl. 2). There is a second type of house, of which there are very few within the walls of old city, but a larger number in the 'new' quarters of Bīr al-'Azab, Bīr al-Bahmī and Bīr al-Shams. These are lower, and have their entertaining rooms on the ground, looking out across vine-shaded pools with fountains (pl. 79, 22.111). A third type, also rare in the old city, has been identified by Rathjens[1] as the Jewish type with a courtyard at the topmost level, from which a number of rooms are approached up and down short flights of steps (pl. 22.137 & 140). Finally, outside the city walls, there are cylindrical tower houses belonging to the farm building tradition (pls. 22.112 and 117).

Most Ṣan'ā' houses are built of stone in the lower storeys with burnt brick walls above (pls. 3, 18, 43). Less common is the use of coursed rammed-earth and plastered mud brick above; some have coursed random rubble stonework below and mud brick for the upper storeys (pl. 22.131). Most Jewish houses, after the Jewish population had been resettled in al-Qā', were built of rammed-earth and plastered mud brick (pl. 89). The cylindrical farmhouses were almost always of the same simple materials (pl. 22.113).

The predominant square tower houses impress the visitor with their height. Many houses are more than five storeys high, the largest commonly having seven, eight or even nine storeys (pl. 40). A view of the city from a distance, with many hundreds of these houses soaring behind each other above the city wall, makes an unforgettable impression (pl. 5).

The Typical Islamic House in Ṣan'ā'

The Concept of the Tower House

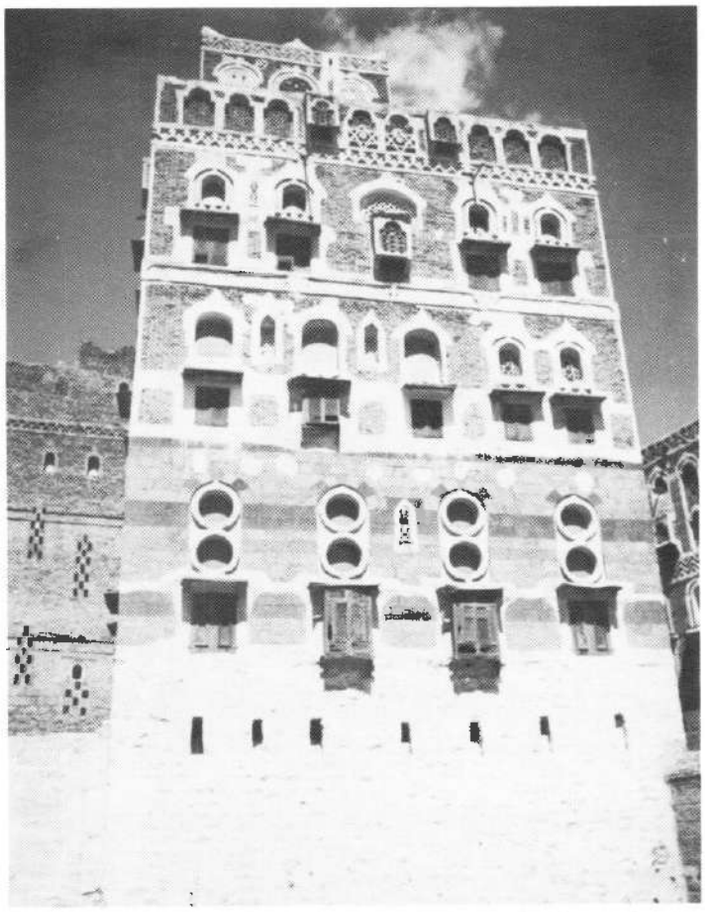
The ground floor is reserved for animals and timber storage, the first upper level is usually used for grain storage and a guard room, if the house is large and important enough to warrant one. The second floor, the first habitable level, has one room in which strangers are received, as well as an ancillary room. Above that is usually the main family room, used for ceremonial occasions, and other living rooms. The kitchen is on the floor below the top-most level, so that it can serve either up or down. The top floor has one or more rooms for afternoon entertainment of guests to chew *qāt*. The staircase usually, but not always, rises through the full height of the building in a square stairshaft surrounded by thick walls, and with a solid central pier. It is placed in the darkest corner of the site, that is, against neighbouring houses, but some natural light is provided through a side wall or a neighbouring light shaft. Small peep-hole-like windows in a stairway are called *rawāqāt* or *thurayyā*.

Women are not restricted within a special part of the house, but the second level from the top, which contains the kitchen, is more their regular preserve than any other. This level is often provided with an adjacent open courtyard with high screen walls in which laundry and drying can take place, and the women can enjoy some sun without being seen from the street or other houses.

Because the walls of the houses are of masonry, and thickly plastered, the extremes of heat and cold experienced from noon to midnight are rarely felt indoors. The thermal capacity of the walls introduces a heat lag which smoothes out most of the temperature difference. There is no heating, although the climate is quite cold in winter.

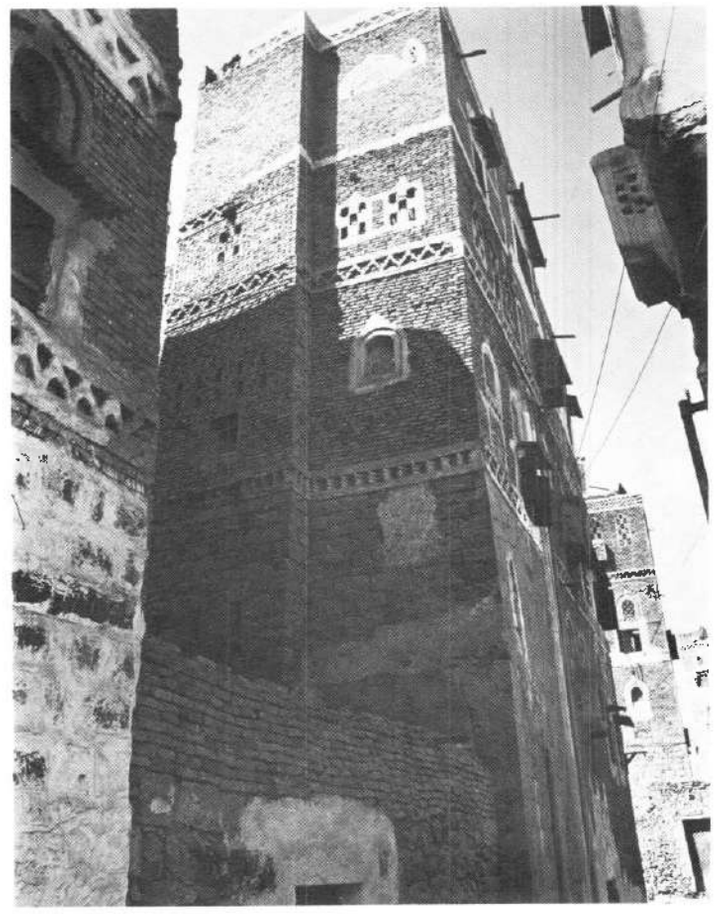
Permanent ventilation is provided in the staircases and lobbies by means of projecting masonry cooling boxes. These have shuttered doors which can be closed in cold or windy weather. Rooms are normally ventilated at a high level by tiny ventilation flaps set in the walls between the fanlights. In the rare event of high humidity after rain, the lower shutters can be opened to provide cross ventilation at body height into the lobbies.

1 C. Rathjens, *Jewish domestic architecture in Ṣan'ā', Yemen,* with an introduction and appendix by S. D. Goitein, Jerusalem, 1957.

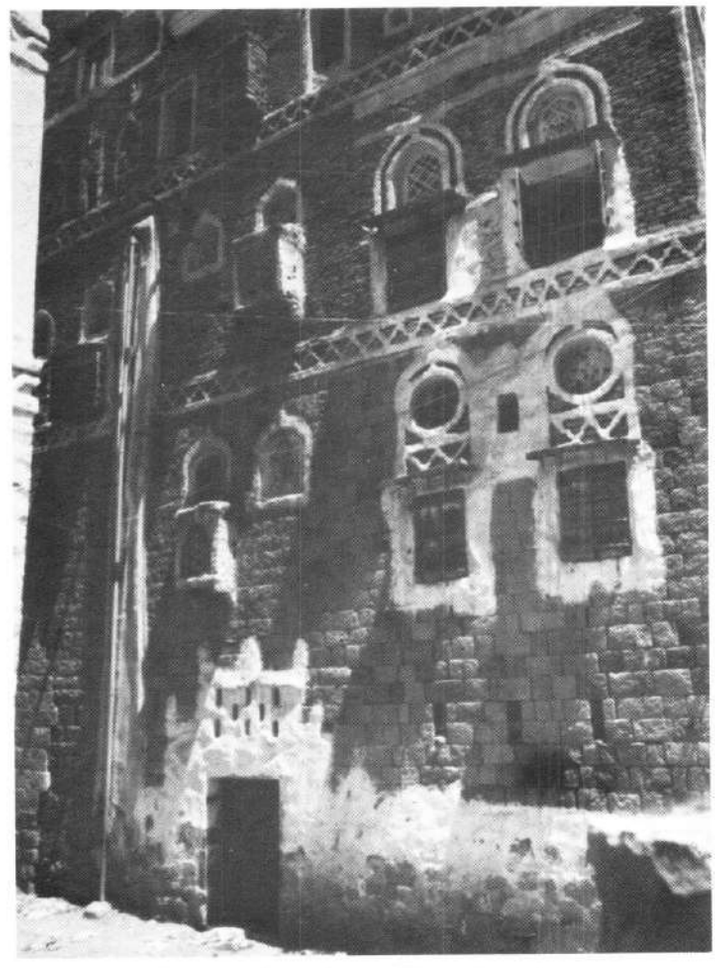


22.1 Characteristic house front, with a separate structure for the *mafraj* on the roof.

22.2 Exterior of House W from the west.



22.3 Exterior of House W from the east.

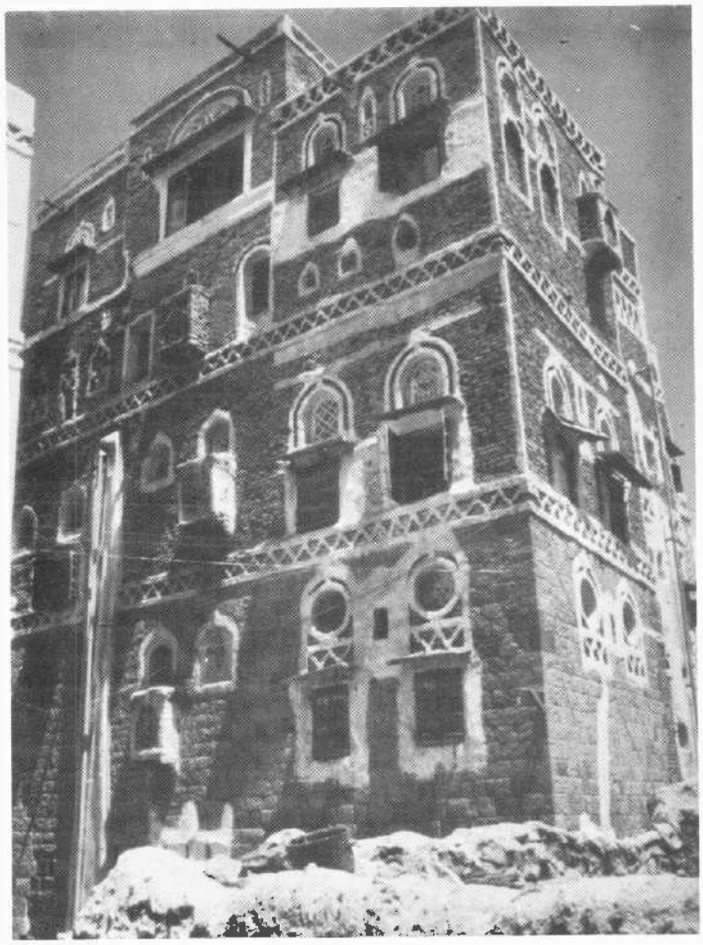


22.4 Exterior of the lower levels of House W from the south.

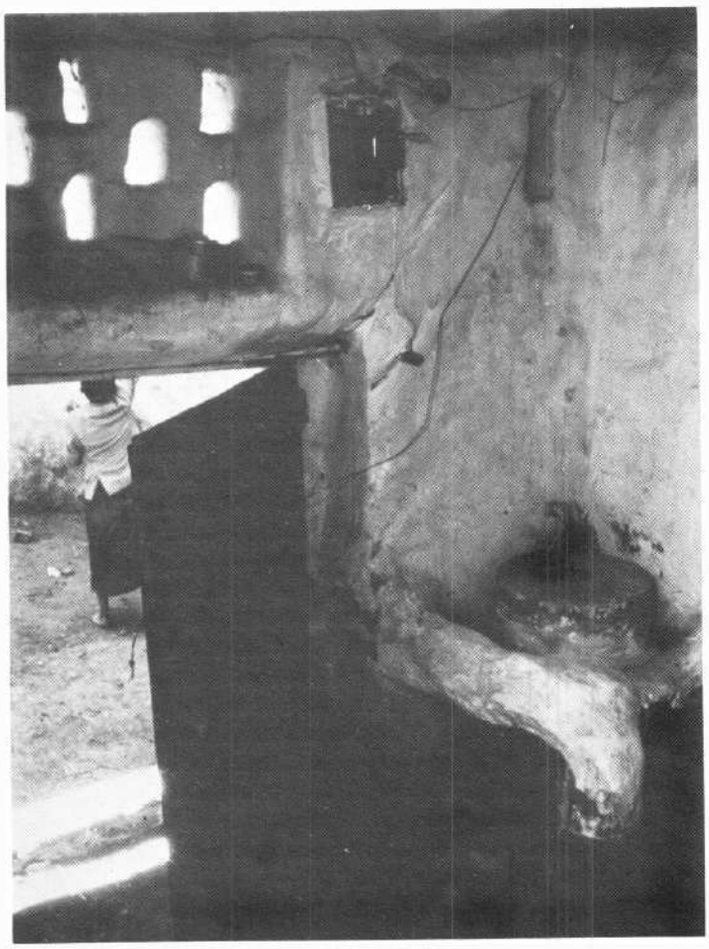
Key to all figures

a animal stalls
b bathroom
br boiler
c court
cu court upper level
ch changing room
d *dīwān*
e entrance hall
eu entrance hall upper level
f warm room
fr furnace room
g grinding mills
gh *ghayl*—water level
h excrement room
hr hot room
j grain and fruit store
k kitchen
l lobby
lt laundry terrace
lb lavatory/bathroom
m *mafraj*
mn minaret
n *miḥrāb*
nw washing floor
o loading and mounting animals
or restaurant/eating place
p passage
pl pool
plr cold pool room
q public ablution area
r room—general use and sleeping
rr reception room and business
rl library
s store
sh sheep pens
sp shop
t terrace
tm tomb
tr treasury
u shaft
v rain water cistern
vm man in charge
w well
wb water cooling box
wr well ramp
x *minbar*
y women's room and wardrobe
z *manẓar*

Fig. 22.1 Plans and section of House W.

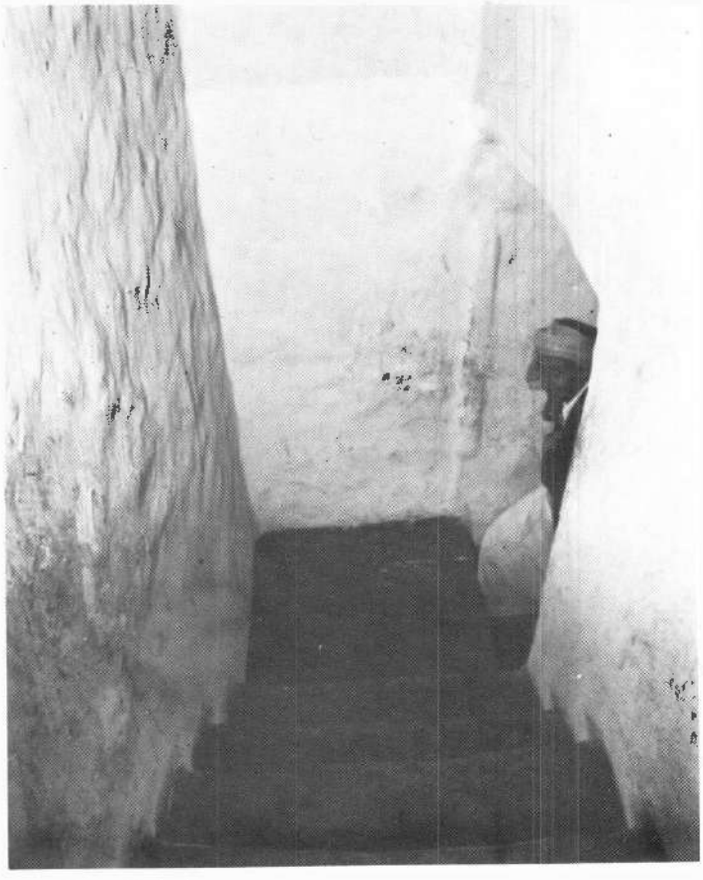


22.5 Exterior of the upper levels of House W from the south.

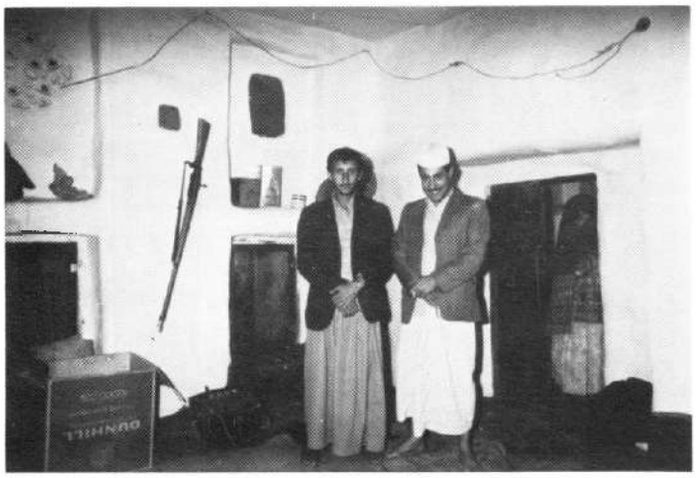


22.7 House W. The entrance from the street, seen from inside.

22.6 House W. Entrance hall, showing some of the animals kept on the ground floor, a goat and two sheep. Note the feeding trough.

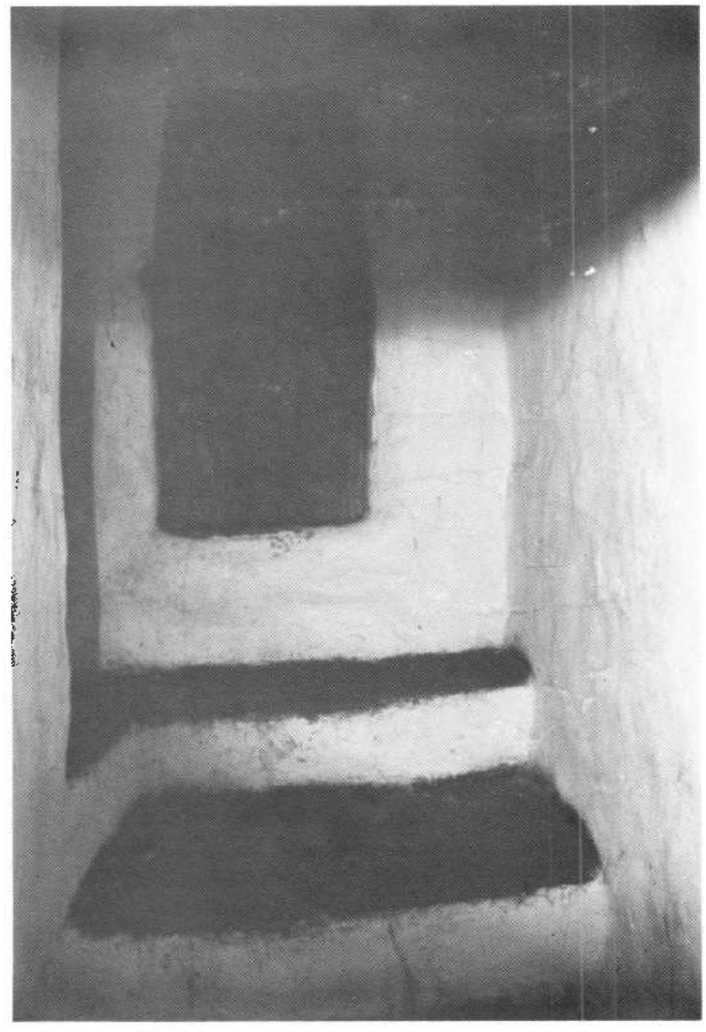


22.8 House W. Staircase.



22.9 House W. Lower living room, the south end.

22.10 House W. Lower living room, the north end.



22.11 House W. Staircase, showing the door to the small lavatory.

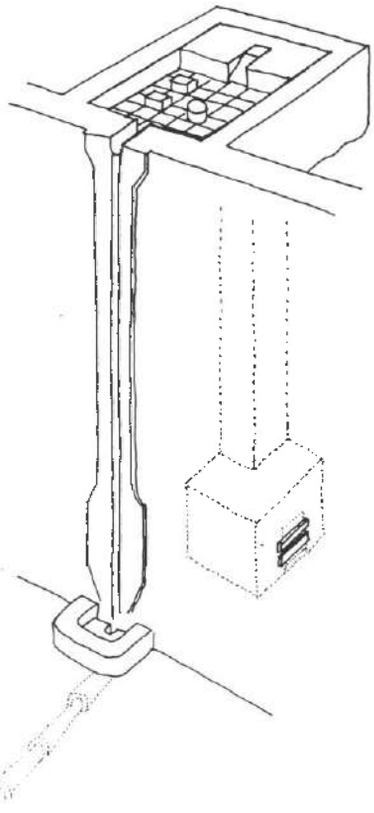


Fig. 22.2 House W. Diagram showing the functioning of the lavatory.

22.12 House W. Lower lobby.

The lighting levels are high, due to the large areas of fanlight above the low shuttered openings. In some cases the fashion for coloured glass has reduced them, but in the older houses the alabaster panels above the shuttered windows flood the interiors with a golden light.

Orientation is considered so important that there is a current saying that a house facing south (*'adanī*) is called *bayt kāmil,* lit. a complete house, a house facing west (*gharbī*) is called half a house, *nuṣṣ bayt,* one facing east (*sharqī*) is called *rub' bayt,* a quarter of a house, and one facing north (*qiblī*) is no house at all (*mā yikūn bayt*).

Yemeni houses are normally built for one family unit; old houses may have two, or even three, closely related families living in them; in a few cases houses are owned by a shaykh, or are *waqf* foundations, in which case they may be subdivided.

The houses are seldom joined together to make one architectural facade. Each house, even if wall to wall with another, appears to direct attention to itself and pays little attention to an exact alignment with the others. Many of the larger houses are so packed that they do not have an entrance court, others stand in small gardens hidden by walls from the streets and lanes.

A Description of an Average-sized House

House W (fig. 22.1, pls. 44, 45 and 22.2) has lower levels of ashlar stonework, up to approximately 6 metres above ground level, and exposed baked brick (*yājūr,* pl. *ājūr*) above. The house is thought to be more than a century old, though it is clear that later modifications have taken place in the upper storeys, as has happened in most Ṣan'ā' houses.

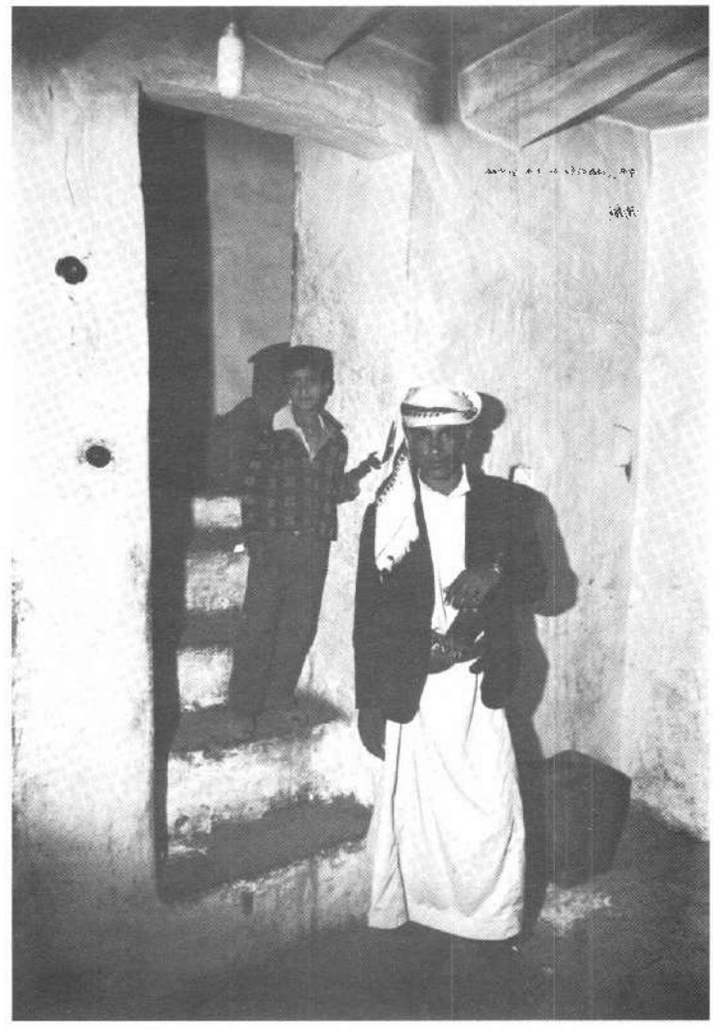
Externally the building is rectangular in shape; there is a slight irregularity in the western wall.

The house is entered through only one opening, a squat wooden door in the middle of the southern side (pl. 22.4). The street level has risen so that one now steps down 20cm to the interior floor level.

The ground floor contains the stalls for the animals, both large stalls (*ḥarr*) and small. They usually take the form of enclosed rooms approached through a hinged wooden door, and ventilated onto the street through small openings in the outside walls. Goats, sheep, fowl, and occasionally a cow and a mule are kept inside the houses of the city in this way.[2] Sheep are sometimes provided with special pens. In house W these pens were under the stairs, with a feeding trough outside two openings in the wall of the pen, through which the sheep thrust their heads to eat (pl. 22.7). (Recently the space above these pens has been closed in with plastered masonry in house W to prevent their escape.)[3] Firewood for the house is stored in the larger animal stalls. The ground floor of the houses also contains the closed room for soil (*qū'ah*) under the 'long-drop' lavatories. Here the excrement is stored and dries until it is shovelled out through a low opening in the street wall and taken away to be used as fuel in the public baths.

The square entrance hall (*dihlīz*) of this house contains the circular stone grinding mill (*maṭḥan*) standing on a square masonry base (pl. 22.6). This is used for grinding the grain and salt used in the house. From the entrance hall the stone staircase (*darājī*) winds upwards around three sides of a central stone pier (*quṭb*) which runs through the full height of the house (pls. 22.8, 11, 13). The entrance hall is lit through slits arranged in a pattern above the front door.

The entrance door is pivotted on stone pads top and bottom, and fits into a recess in the thickness of the outer wall. It is furnished internally with two sliding wooden bolts. The lower one can be operated from outside by a large key, which must be turned four or five times to force the bolt to slide back by a series of notches cut in its under face (pl. 22.126)). The upper bolt cannot be opened from outside, but it can be closed by pulling a cord passed through a hole in the door. This enables the inhabitants to completely secure the house against intruders, even the possession of a key to the house not enabling the door to be opened. This second bolt can furthermore be opened from any level of the house by pulling on a cord (*majarr,* sing.) which passes over a wooden pulley and up vertically through holes in the floors of the upper staircase lobbies; the cord is fastened to the end of the bolt, drawing it from its socket. It is customary for a visitor to shout from the street to the inhabitants above, who then open the door in this way. Alternatively, a special knock may be used on each house which is known only to close friends or the inhabitants. The bolt operated by the key serves then merely to lock the house when no-one is inside, to prevent inhabitants leaving, or as a second security lock at night.



22.13 House W. Stairs on top lobby.

The first upper level (storey: *ṭabaqah,* more usually *dawr,* pron. *dōr*, also *ṭarḥah/ḍarḥah*, pl., *ṭaraḥāt*) of the house W contains two rooms and a bathroom-lavatory. Above the entrance hall there is a lobby (*ṣālūn* or *ḥijrah*), off which double doors open into a family living room (called a *makān wasaṭ*), the equivalent of a lower *dīwān* in larger houses, into which strangers are customarily shown for reception. On the opposite side of the lobby is a store room for grain (*makhzan*) and the bathroom/lavatory. The floors throughout are made of flag stones, which are carpeted in the family living room.

The *family living room* is furnished in the fashion of almost all

2 Animals are driven through the streets to pasture during the day, and fed and watered in the evening. See p. 170. The floors of their stalls in the houses are seldom paved, but are made of clay or loam.

3 Under the stair (*taḥt al-daraj*) of a house in Wādī Ḍahr we saw a pen (*'ikwaf*), for the *'alīf,* an animal being fattened. The pen has a wall in front of it but a hole in it so that the animal can look out.

Yemeni rooms, whether they are used for eating, sitting or sleeping, or all three functions together (pl. 56, 59). That is, the area nearest the door is generally kept clear to allow the removal of shoes just inside the room, and part or all of the remainder of the space is carpeted or covered with linoleum (*mushamma'*) and fringed around the walls with a continuous seat of cushions or mattresses. Where the centre of the room is carpeted, linoleum or a sheet of plastic is carried in when *qāt* is to be eaten, on which the stalks can be thrown after they have been stripped of their tender leaves; therefore one speaks of *al-mushamma' ḥaqq al-qāt.* A leather mat used to be used for setting food upon, this being known as *al-naṭa'/al-naḍa'*—one would say, *'Jib al-naṭa' nakul,* Bring in the leather mat and let us eat'.

The seating cushions or mattresses (*mafrashah,* sing. or *yurqān,* or *farsh*) are stuffed with wool and generally 11cm thick and 64cm wide. Behind the mattresses or cushions, against the plaster wall surfaces, stand vertically-placed hard cushions as back-rests, called *wisādah,* which are stuffed with straw and measure 45cm by 60cm. Above these are sometimes placed small softer cushions as head-rests, often fringed white anti-macassars, called *bint al-wisādah.* There are usually hard armrest cushions, 25cm square, stuffed with straw (*madkā,* pl. *madākī*). There may be a small soft cushion on top called a *mikhaddah.* Strip carpets (*fardah*) may cover the seat cushions, or they may be separately covered in patterned cloth. Curtains (*bardah,* pl. *-āt*) are sometimes used (Turco-Persian *pardah*).

The windows have low sills, approx. 45cm high, so that people may see out from a sitting position. There are typical small opening windows (*ṭāqah*) below, each closed by two wooden shutters (*duruf,* pl. *diraf*) and a separate arched or circular area (*'aqd*) above each window, of fixed translucent material to give light to the room even when the shutters below are closed. This material is either thin alabaster sheeting (*qamarī*) approx. 1.5cm thick, or coloured glass set in gypsum sheets, a process which is described below (p. 484b). (If plain glass this type of window is called *'aqd ṣāfī,* if of coloured glass it is called *'aqd mulawwan*.)

During this century the practice of introducing a pair of clear glazed sashes inside or outside the lower wooden shutters has slowly grown up in Ṣan'ā' as can be seen here. It is not found in older, unaltered houses, or in outlying areas.

Between each pair of arched upper windows there is often a small opening for ventilation which can be controlled by means of a small shutter (*shāqūs*) (pl. 56, 22.50).

On the walls of the room are high shelves (sing. *raff,* or *rafīf* or *ṣafīf* in Ṣan'ā') made of hard gypsum plaster without reinforcing, on which articles can be placed when not needed. Wall recesses, known as *mughaffarah*, are usually of panel shape.

The ceiling, both the rough beams and the surfaces in between them, is completely plastered and whitewashed.

The *bathroom-lavatory* contains a 'long-drop' lavatory and a 'bidet-shower'. The lavatory (*masqaṭ*) consists of a stone platform 70cm square with a square hole in the centre 22cm by 14cm (pl. 44). The latter opens into a vertical shaft which drops down into the masonry room for collecting excrement underneath. In front of the hole is a sloping section in the stone platform, the same width as the hole, which leads liquid down to a channel in the stone floor. The channel takes the liquid through an opening in the outside wall (*majrā*) whence it runs down the face on a specially constructed and shaped vertical draining surface, made of waterproof *qadād* plaster called *masḥalah* (pl. 22.14). Frequently these vertical drains are elegantly shaped and decorated. As soon as it reaches the ground the liquid disappears into an underground drainage sump, *'ūqah* from which it is led to underground french drains for dispersal into the soil. A recent tendency, introduced within the last few years, has been to collect liquid at a sump at the level of the lavatory and lead it down the face of the wall in a pipe, whence it is taken into the city's new drainage system.

Smell is completely eliminated from the lavatory in two ways. Firstly, by ensuring that liquid is not led into the 'long-drop' shaft, or the chamber far below, the excrement dries very quickly (Ṣan'ā' has a low humidity) and becomes odourless. Secondly, a pot or scoop (*maghraf*) stands on a stone cylinder near the lavatory with which the surfaces over which the liquid has flowed are swilled down after washing on completion of defecation.

The bathing facilities consist of a pair of square stones spaced approx. 12cm apart (*'aḍidah,* pl. *'aḍā'id*) on which the user squats, and a cylindrical stone (*kharazah*) centrally in front of them which has a recessed top upon which the water pot is set. This latter is usually an earthenware pot of about 20cm diameter, without handles and with an open neck approx. 7cm wide. Sometimes a low, more open, container is used. Often a much larger earthenware vessel for water is placed in one corner of the bathroom or its lobby, from whcih the bather's supply can be replenished.

In the outer wall of the lobby (*mas'ā*) is a projecting window box (*shubbāk*), built of open-work masonry above timber beams (pl. 22.5), with spaces to allow the passage of currents of air. The bottom is made of wooden slats, or of boards with several holes drilled in them. This serves both to permit a view of the front door below without being observed, and as a cooling box in which earthenware jars of water may be placed, or hung on hooks, to catch the wind. It is therefore sometimes called *bayt al-sharbah.* There are two arched fanlights of coloured glass in the wall above to light the lobby. A neatly framed hole in the south-west corner of the floor allows the passage of the rope to open the front door bolt, which runs up that corner and continues through a neat hole in the ceiling to the floor above.

The second upper floor is reached by returning to the staircase and proceeding up a further three short flights around the central stone staircase pier. At the top of the second flight is a door which leads into a low bathroom (*ḥammām mā'*) which has a shower-bidet but no lavatory.

From the second floor lobby (pl. 22.12) double doors lead on the east to the main family room (*dīwān*), and on the west to a private sleeping-living room with a store-room behind it. The family room is used, in many houses, only for important events, childbirth, weddings, feasts and the laying out of the dead, and kept locked at other times. In house W, where an uncle's family share the house, it has become a second general-purpose room. The lobby has another water-cooling box built of masonry projecting through the front outer wall, with a wooden slat bottom which allows a screened view of the street and of people waiting at the front door.

The third upper storey is reached up a further three flights of the same staircase. At the top of the second flight is a bathroom similar to the one below it.

The lobby (pl. 22.13) has a third water-cooling box projecting through the front wall. This is centrally placed, while the two below are to right and left of the centre, so that all three retain a view of the front door.

In the east wall of this lobby a low door gives access to a store of generous area, reached down two steps, which, however, is less than two metres high.

On the other side of the lobby is the kitchen, (*maṭbakh,* or, in Ṣan'ā' dialect, *daymah* pl. *diyam*), a smoke-blackened room containing a masonry bench in which are set the barrel-shaped pottery bread ovens (*tannūr*) on the northern wall (pl. 22.14). There is a masonry oven next to the bread-oven, which has a chimney emerging on the roof two floors above. The bread oven bench, more than a metre depe and a metre high, is composed of a row of three or four pottery ovens, each with a hole above 15cm in its top, built into a masonry bench, with front access (*bāb al-manāq*) to each oven so that hot coals can be inserted or removed during the cooking process. The masonry construction of the bench is packed with ash for insulation. There is another masonry bench on the southern wall, extending

slightly around the western side, which is used for the cutting and preparation of food, and for individual quick eating. Near the door is the raised washing platform which drains through the wall on to the vertical drain outside. A vegetable pounding stone (*mashaqah*) with a stone roller stands on the floor, and is operated by a woman squatting in front of it.

Smoke from the coals in the *tannūr* finds its way out through the northern, western and southern walls, which are pierced with a large number of holes arranged in seven patterned areas (pl. 45 and 22.15). There is a window below the holes in the southern wall, closed by a single shutter.

On one side of the room there is a low hole for garbage to be thrown outside to the lane (*zuqzuqī*).

The fourth upper level is composed of three main rooms all at different levels, since each is approached from a corner landing of the three-flight staircase. The central staircase pier is here reduced to less than half its former width, since it now has to carry only the weight of the top floor and the roof. This permits the lobby to the room on the east to be made larger, and allows a small store-room for clothes to be included. In the outside wall of this storeroom is another projecting box for water cooling. This suite, at the right of the first flight, is used almost exclusively by women and young children.

At the head of the next flight two further steps lead to a smaller landing—off which opens the western room, a general-purpose room used for sleeping, entertaining close friends or eating. This is the only room in the house which has a view-window facing north, over the market (Sūq al-Milḥ) some 500 metres away, and for this reason is called by the name *manẓar,* meaning a reception room with a view.

The final flight of steps leads to the highest room, the main entertaining room for private parties, in which *qāt* is chewed in the afternoons. This room faces south, as it should ideally do to catch the sun, has a magnificent view over rooftops, mosques, minarets and gardens, and is the principle *manẓar* of the house (pls. 54, 55). In keeping with its function as the main entertaining room it is more richly decorated with plasterwork and coloured glass than any other room (pl. 22.18).

A small door at the top of the stairs, just outside the door to the higher *manẓar,* leads on to the roof.

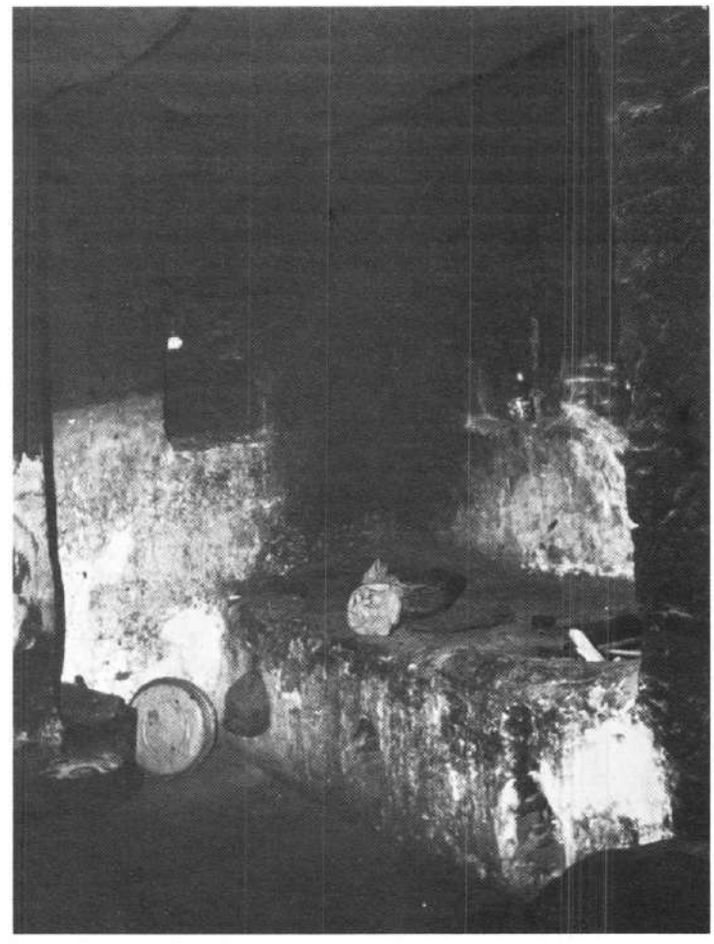
The roof is a flat plastered surface used for spreading out washing to dry. Rain which falls on the roof is collected at the low outer parapets and then discharged well clear of the walls by means of wooden spouts (*mashrub/mīzāb*) averaging nearly a metre in length (pl. 22.3).

Variations in Other Average-sized Houses

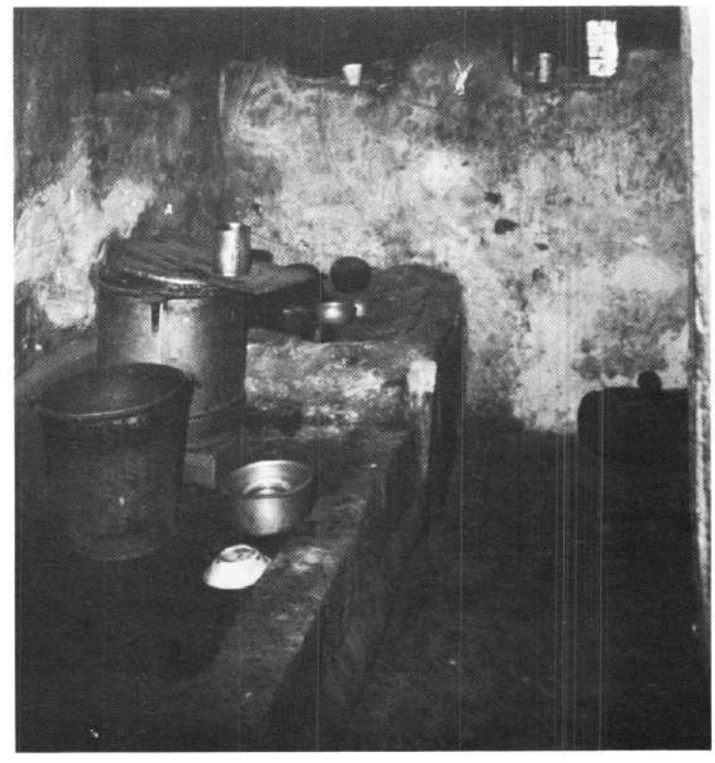
Size of rooms: House W has smaller main rooms than the average Ṣan'ā' house. House N (fig. 22.3, pls. 50, 74; 22.19-24) and house NT (fig. 22.4, and pls. 22.26-31, 34-41) have *dīwāns* which are respectively 6.5m and nearly 5m long, compared with only 3.75m in house W. Similarly, the family living rooms of houses N and NT are both nearly 5m long while that of house W is again merely 3.75m. Finally, the *manẓar* of house NT is 6.5m long, as against a little more than 3m in both house W and house N.

Wells: Many average houses have a well inside the house, whereas house W does not, situated as it is within 15m of a public well. The well in house N is in a small room off the ground floor entrance lobby, approached up a flight of steps. That in house NT extends up through the house to the second floor from the top, the kitchen level (pl. 22.34). It is a small square shaft within the house, about 28cm by 22cm, built above a circular stone well which extends approximately 30m into the ground.

There are wooden pulleys over the well above the top level at each floor of the house so that water can be drawn on the ground floor for the animals, on the living floors for the living rooms (pl. 22.37), and on the kitchen floor for the kitchen. The well is cemented with a special strong waterproofing mortar made by mixing wood ash, animal hair and hairy seeds of rushes into the lime plaster. A leather bucket is used, drawn on a rope.



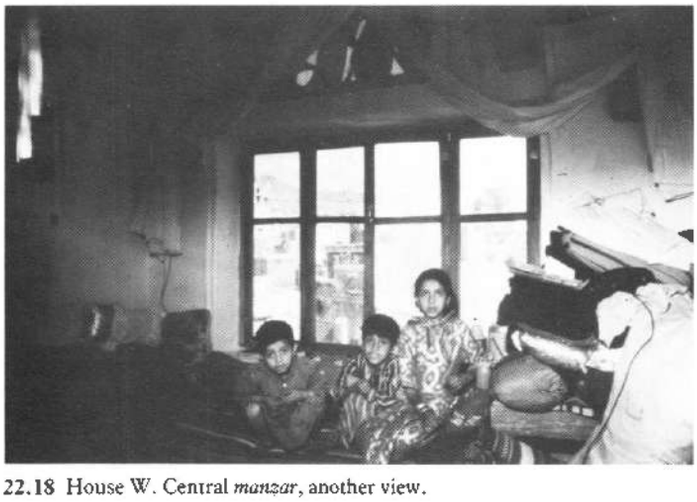
22.14 House W. Cooking stove.



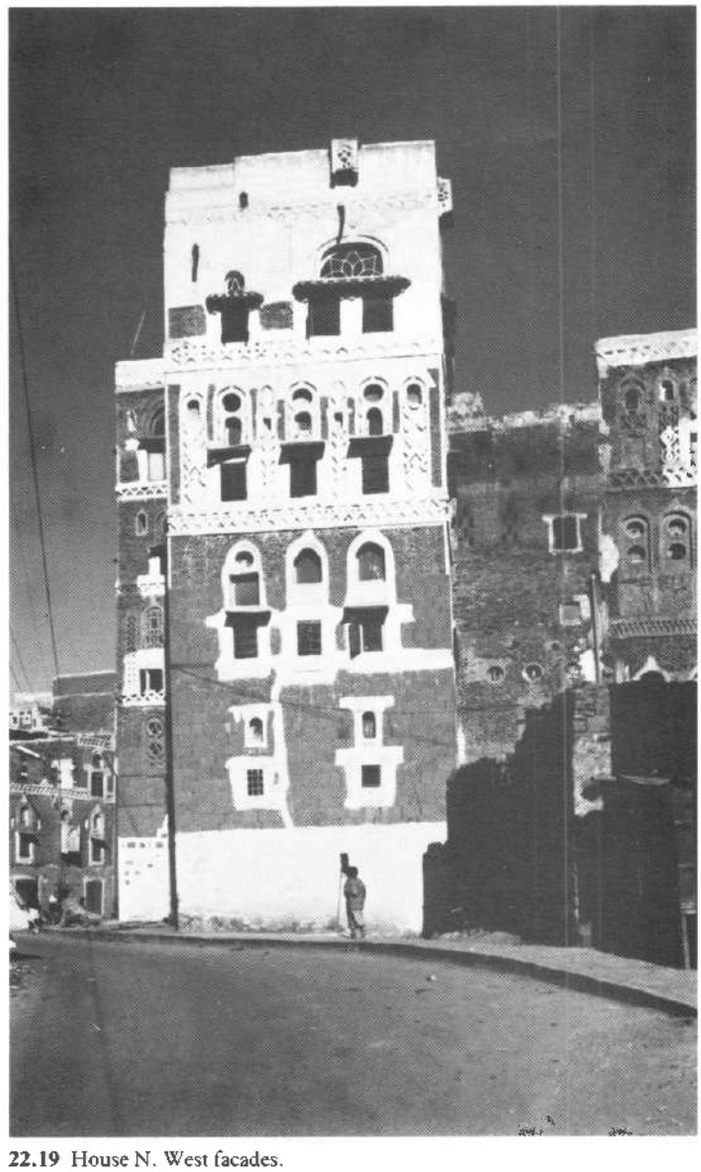
22.15 House W. The other end of the kitchen

22.16 House W. Small room for use of the women.

22.17 House W. Central *manzar*.



22.18 House W. Central *manzar*, another view.



22.19 House N. West facades.

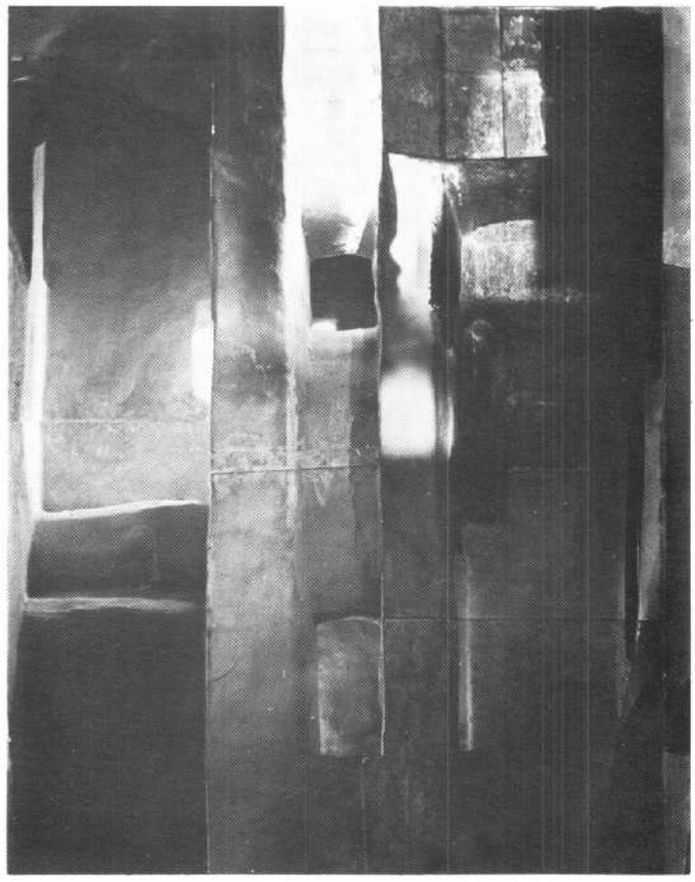
Vertical distribution of rooms: While house N has a very similar vertical distribution of rooms to that of house W, house NT is one floor lower, and has combined the family-living room level (usually the first upper level in a small house) with the kitchen level which remains on the second top floor. In effect this has eliminated the first upper floor level as it exists in house W, with the result that the *dīwān* is the lowest main room. This is a variation occasionally met with in other small houses. In house NT the *manẓar* is approached from the roof terrace, on to which the top of the staircase opens.

Kitchens: The kitchens of houses N and NT both have elaborate provision for disposing of the smoke through a range of chimneys immediately above the stove (pl. 22.40). The whole ceiling area of house NT above the stove is raised so that wind passes through on both sides to draw smoke from the room (pl. 22.38). In house N the kitchen is actually the highest room in the house, a few steps above the *manẓar*. It seems possible that this house, which is often pointed out as being at least 250 years old, once had a higher room for entertaining; a supposition supported by a projecting water-cooling box at roof level.

These kitchens contain a washing floor (*sāḥil*) with a raised kerb, which is drained through a hole in the wall, a feature house W does not have.

Lavatories: Both houses N and NT have bathrooms which contain lavatories on three upper floors. This means that a vertical soil shaft passes through the lower bathrooms. It is a

22.20 House N. Exterior of entrance.



22.22 House N. Staircase from landing, showing the pierced central pier.

22.21 House N. Interior of entrance.

22.23 House N. Eating a meal in the *dīwān*.

Fig. 22.3 House N. Plans and section.

plain masonry box plastered so that it appears part of the walling of the house. The lower box contains two shafts. Liquid passes on to a vertical draining surface on the outside of the house, shared by the three bathrooms.

Bathrooms in most houses are on the cold, or north, side of the building. The walls are hard smooth gypsum plaster for ease in washing.[4]

Alabaster Plasterwork: House NT preserves in its entrance hall, staircase and lobby walls an old feature which was probably removed from the other two houses at some time during their renovation. This is the decoration of the lower wall surface up to waist height with hard honey-coloured plaster (*marmar*, or *qamariyyah*) polished so that it shines like marble. In the lobbies the plaster surface is moulded into patterns, each contained within a framed panel (pl. 22.37). In the staircase a stepped band runs continuously and reflects the pattern of the stairs (pls. 22.29, 30 and 34). Throughout the house there is a theme resembling a fleur-de-lys with dots incorporated into this plasterwork, a half fleur-de-lys surmounting each step in the upper decorative band on some areas of the staircase wall. It has, however, been suggested that, 'In northern Yemen a constantly recurring motif, especially in external plasterwork seems to be the young *dhurah* plant'.[5] This type of plaster is made of ground alabaster and gypsum; it gradually darkens with age until it is almost black, a characteristic shared by the alabaster panes in the upper windows (pl. 22.37). This darkening may be why it has been so often stripped from Ṣan'ā' houses. (Similarly, alabaster window areas have often been replaced in recent years by sheets of obscure or clear glass).

Windows: Both houses N and NT are older than house W, and preserve more of the original circular alabaster windows above the shuttered openings. Those of NT have tiny glazed opening sashes let into several of the alabaster panels, apparently to allow extra ventilation

Rooms incorporated from adjoining houses: House N incorporates two storerooms on a mezzanine level between the ground and first floors which are within a neighbouring house. They are entered from the second staircase landing. This is not commonly done in Ṣan'ā'.

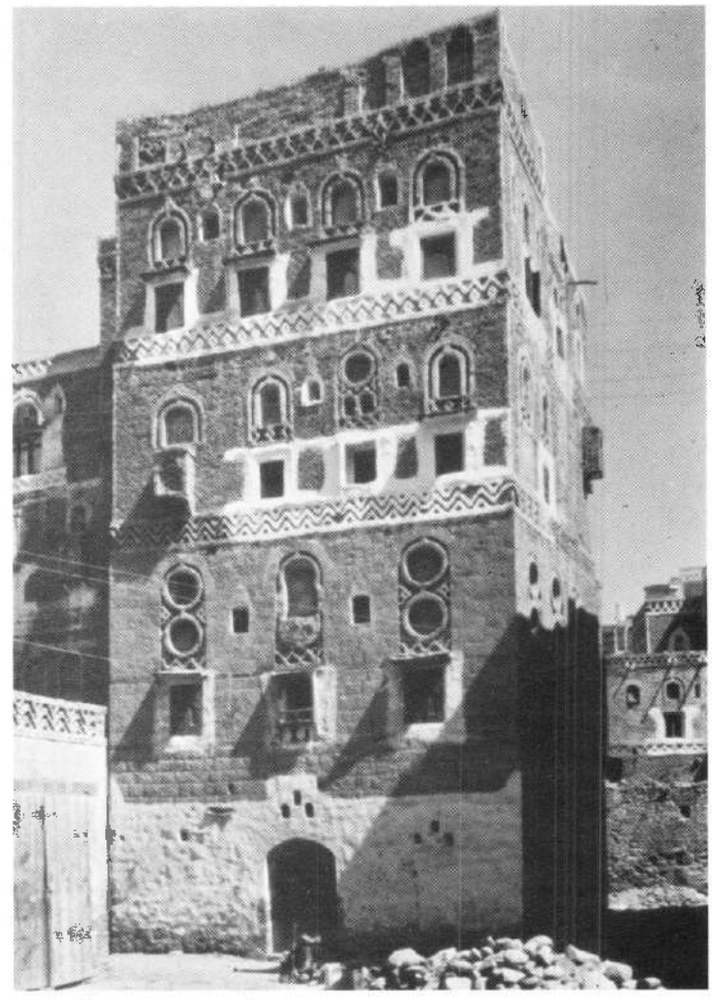
4 Al-Rāzī *Tārikh madīnat Ṣan'ā'*, 97, says that 'one's privy (*khala'*) in Ṣan'ā' is called *mustarāḥ* because of the pots in it of all these sweet-smelling herbs (*rayāḥin*) which I have mentioned to you and the rest of odiferous herbs, and on account of their spaciousness, roominess, and the 'concrete' (*qaḍāḍ*) of their pits (taking *qi'ān* as a plur. of *qū'ah*), channels (*majārī*) and walls, the penetration of air into them, and the clear light in them, unlike the privies elsewhere in which you come face to face with and see confinedness, and the foulness of the air that hangs about them, so that the relief through them is more harmful to bodies and spirits than many of the afflictions which beset a man from other unpleasant and dangerous things caused by the confinement of the air in the privies hanging about them.'
Another term is *muṭhār*, as in Goitein, *Jemenica*, 137, no. 1008, *lāzim fi kull bayt muṭhār*, Every house must have a lavatory. Various applications of this proverb suggest themselves.

5 Doe and Serjeant, 'A fortified tower-house in Wādī Jirdān (Wāḥidī Sultanate)', I, 9.

22.24 House N. *Manẓar*.

22.25 A youth playing a flute in the *manẓar* of a modest house.

Outside storerooms: House NT is one of a relatively small number of houses in Ṣan'ā' which have private storehouses (*samsarah*) attached to them. This is possible because the house is flanked by a second street on the south, from which a wide gate opens into a rear yard (*ḥawiyy*) which in turn provides access to the storehouse. The latter is a separate structure of roughly coursed rubble (pl. 22.41) with a ceiling of unplastered beams and tied sticks, waterproofed externally with plaster; it has a floor



22.26 House NT. View of exterior.

area nearly that of the ground area of the house. The storehouse may be reached from the house by means of a back door which opens into the courtyard from one of the animal stalls. Such stores were built related to the houses of the farmers who live in Ṣan'ā', but farm in areas outside the walls.

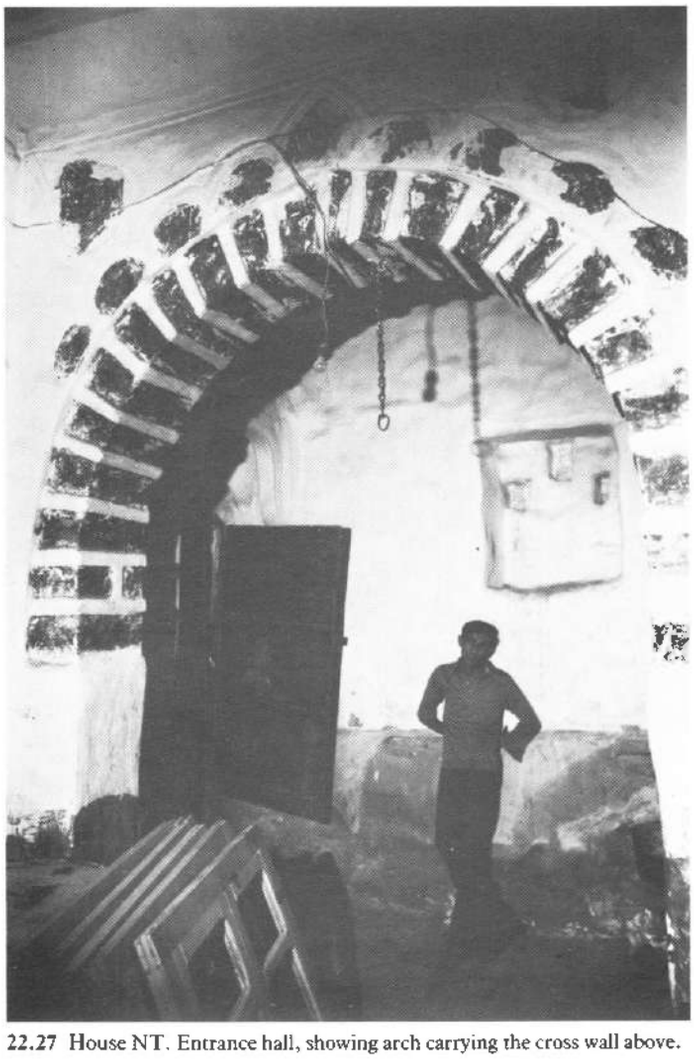
Symmetry: Symmetry, or at least symmetrical balance, was felt to be desirable in Ṣan'ā' houses, as is clearly evident by comparing the main facades of these three houses (pls. 22.2, 19 and 26). In house W this desire has produced a nearly symmetrical plan. In houses N and NT the plans are less symmetrical, because the staircase is on one corner, but the main facade retains its balanced eurhythmy: even having a central doorway, in house NT, and in the other case having no doorway, which is on another facade, but instead two symmetrically placed lower windows.

It is thus clear that Ṣan'ā' architecture, even in small houses, had a strong ingredient of conceptual formality. It is this which gives a quality of ordered repose to the exteriors, a characteristic which is even more strongly felt in the interiors, with their plain whitewashed cubic or rectangular rooms punctuated with even rhythms of doors, square or circular windows and shelves; rooms which in each house are approached up a plain staircase of short easy flights within a square plan.

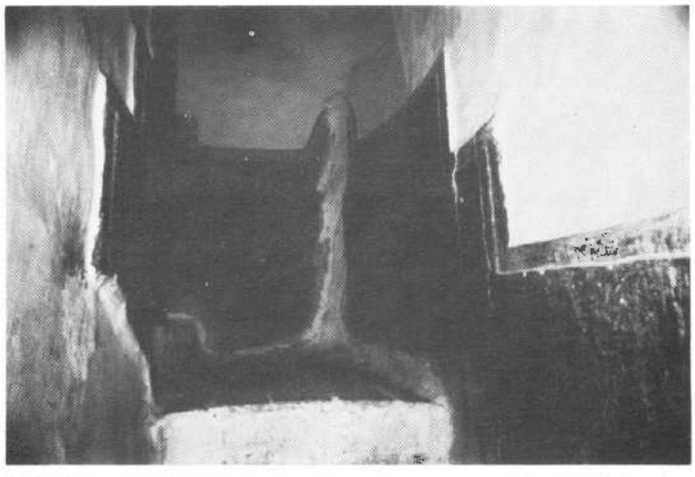
It is a classic architecture of simple form, proportion, balance and spaciousness.

Large Houses and Palaces

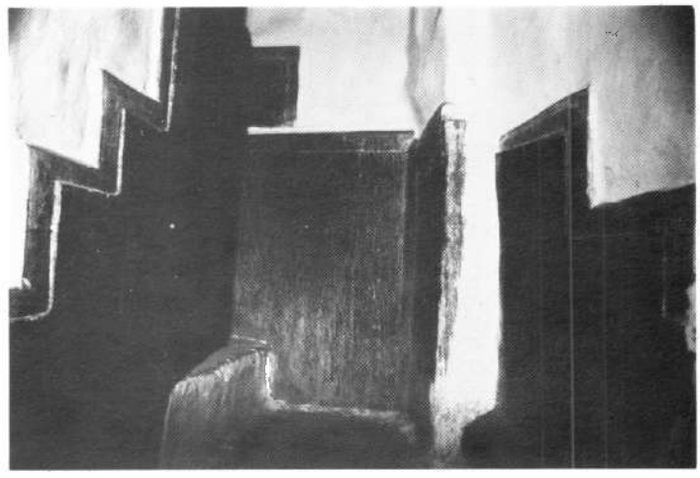
Large houses are substantially bigger than those considered above, both in area and in height. The added storeys make possible the inclusion of two new floors: a mezzanine between



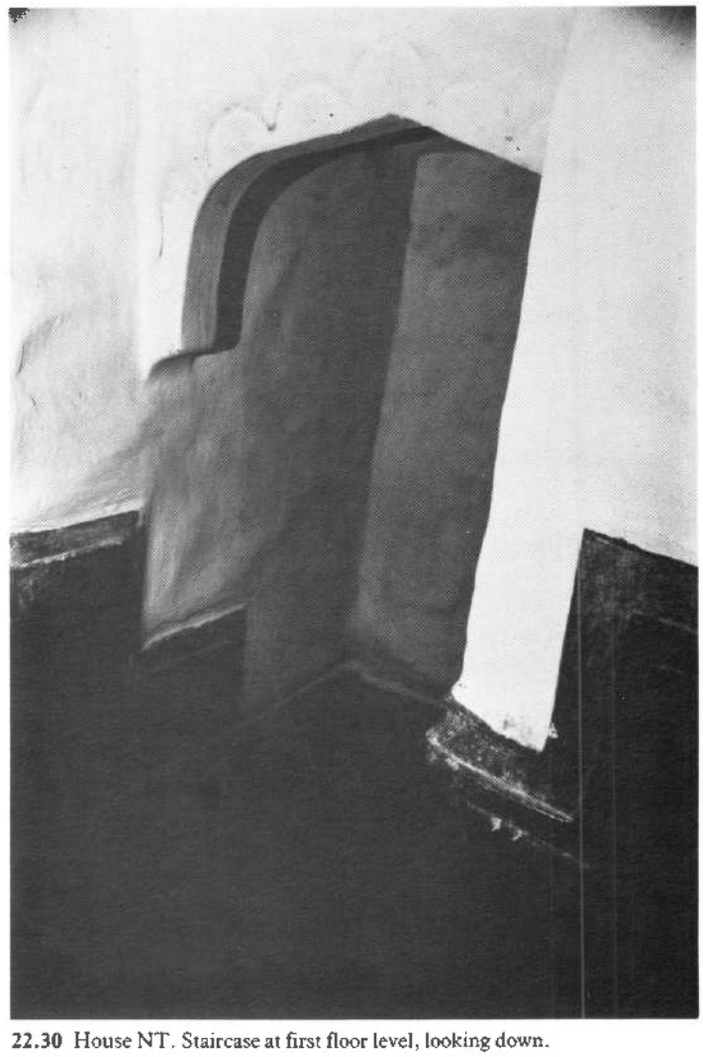
22.27 House NT. Entrance hall, showing arch carrying the cross wall above.



22.28 House NT. The beginning of the staircase at ground floor level, showing the dado of alabaster plaster.



22.29 House NT. Landing of the staircase between the ground and first floor levels, with an alabaster plaster dado.

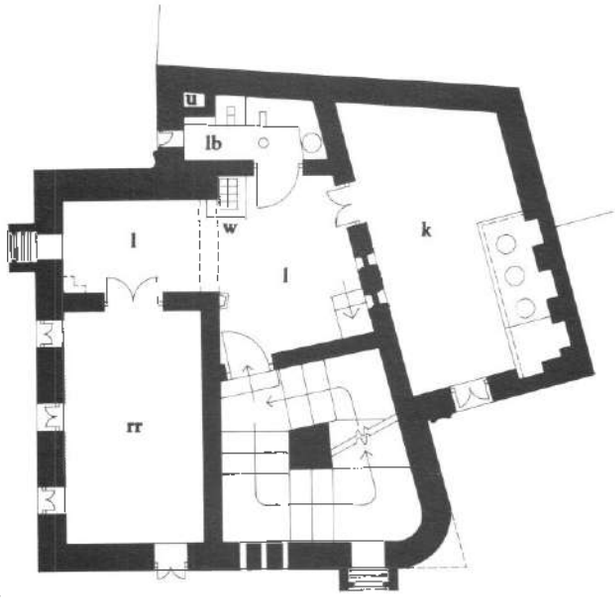


22.30 House NT. Staircase at first floor level, looking down.

the ground and the first habitable level, for the storage of grain and goods, and a large reception room on the roof, with a view in every direction, the *mafraj*. A *ṭabaqah* is another floor with a *makhzan wa-ḥarr* i.e. a store and a stable. The added area allows more spacious lobbies on each floor, which begin to be used for service activities, and sometimes permits suites of rooms for the use of different families sharing the same dwelling.

The entrance hall: In a large house the entrance hall is very spacious, allowing a number of saddle animals to be housed and providing space for riders to mount and dismount. A small masonry platform (*raṣīf*) is usually built for the latter purpose against one wall, approached up a small flight of two or three steps (fig. 22.8). A second or alternative platform is sometimes provided outside in the street, built against the wall of the house next to the entrance door.

The entrance hall usually rises through two storeys, the mezzanine level for the storage of grain surrounding it, with access either through small doors placed high in the walls from the main staircase (house JY, fig. 22.8), or up a special fight of steps with secondary access from the main stairs (house S, plans, fig.



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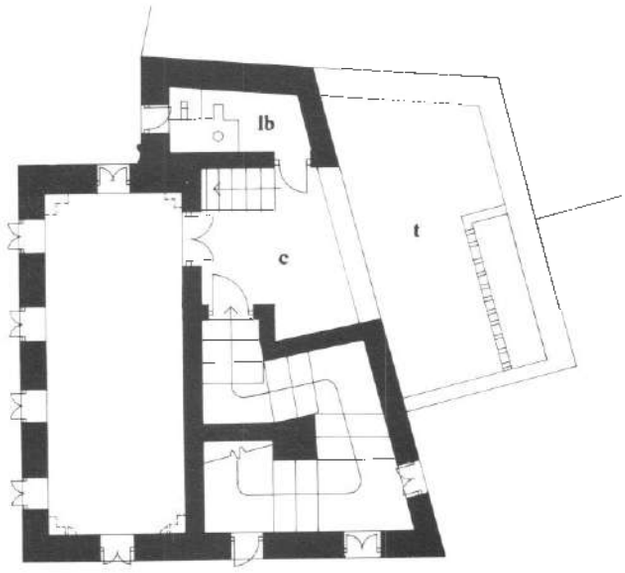

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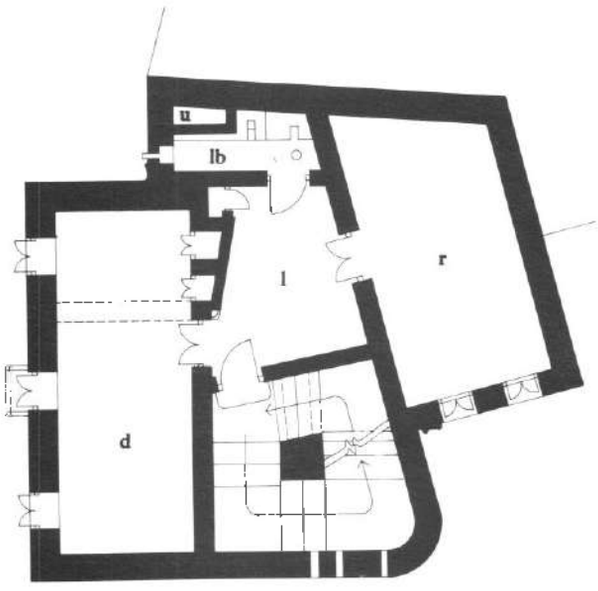

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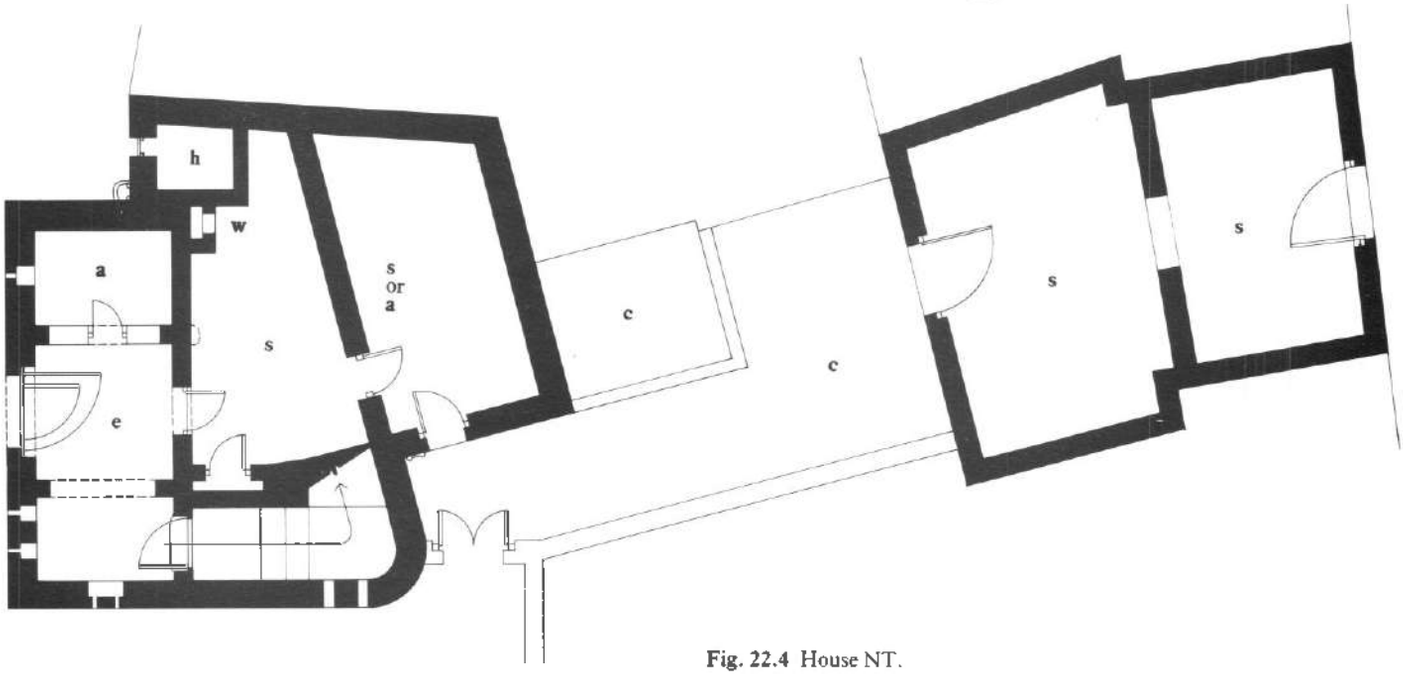

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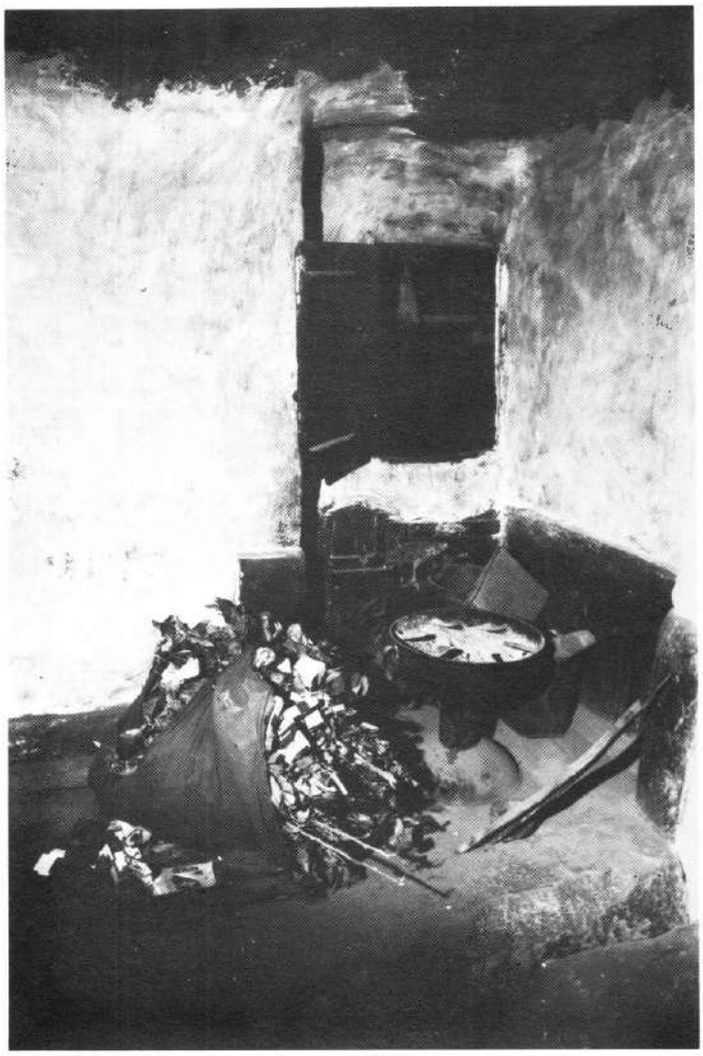
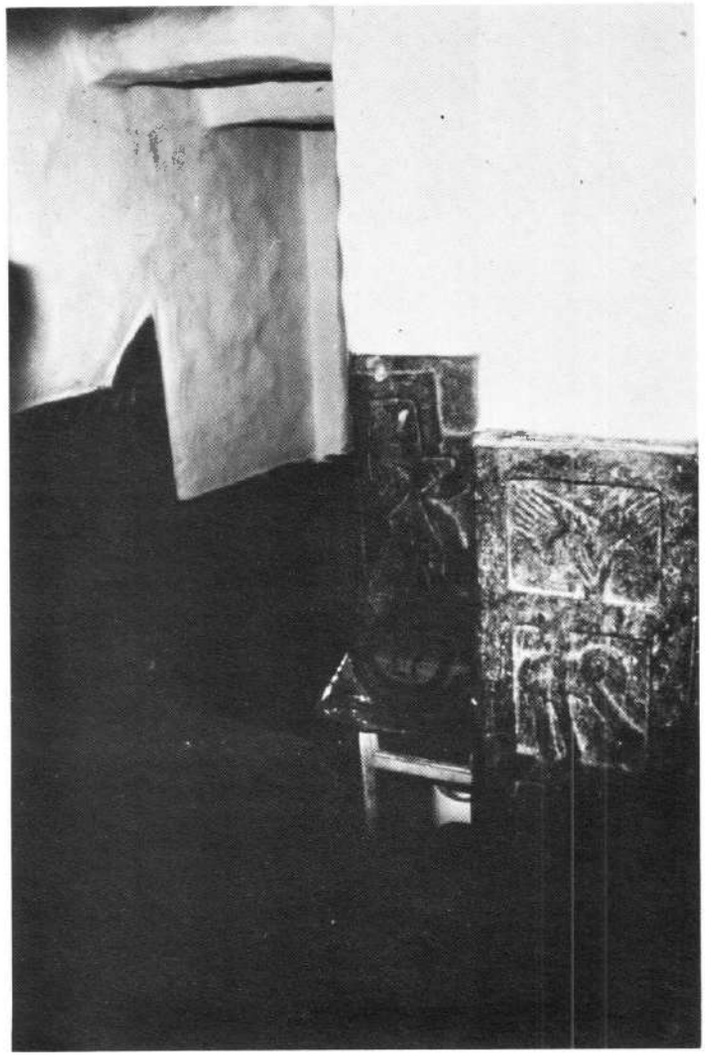
Fig. 22.4 House NT.



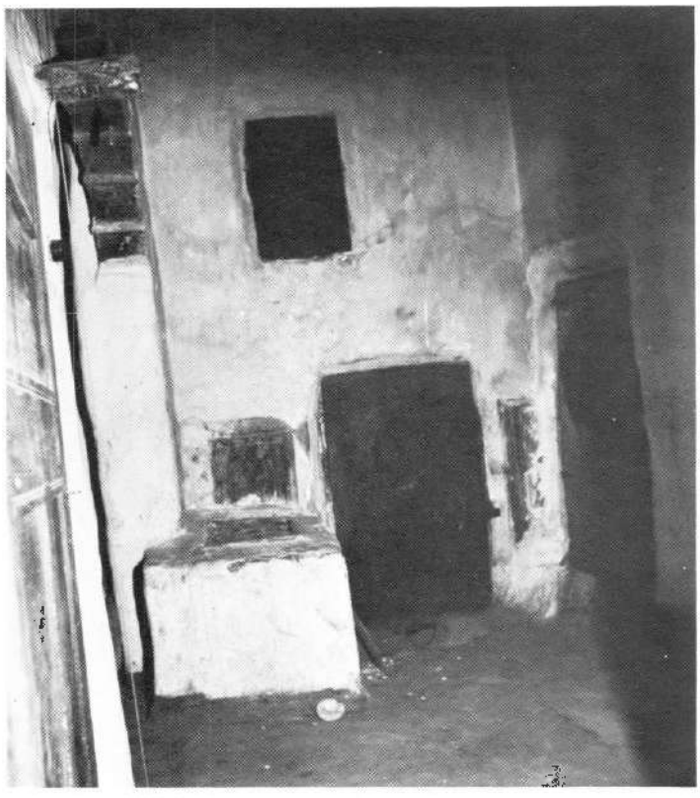
22.31 House NT. Lobby, at first floor level, showing the well in the wall, with a brazier and a bundle of leaves in front of it.



22.33 A staircase and landing of another typical old house, with a decorated dado in alabaster plaster.

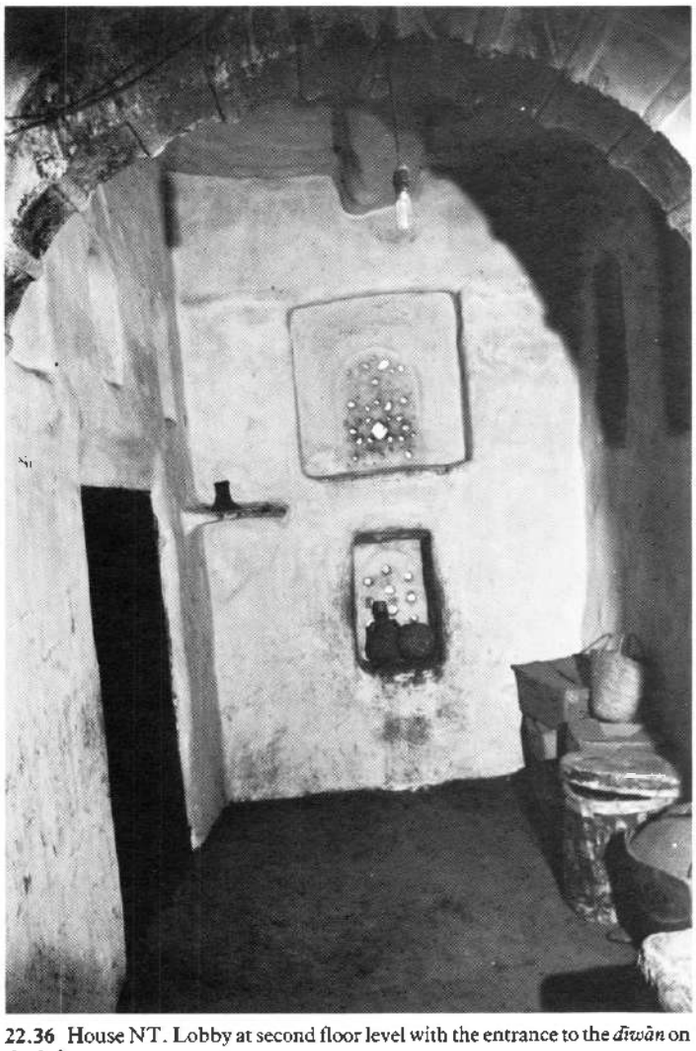
22.32 Alabaster plaster dado on the staircase wall of an old house near the Great Mosque.

22.34 House NT. Staircase at second floor level, with richer decoration on the dado of alabaster plaster.

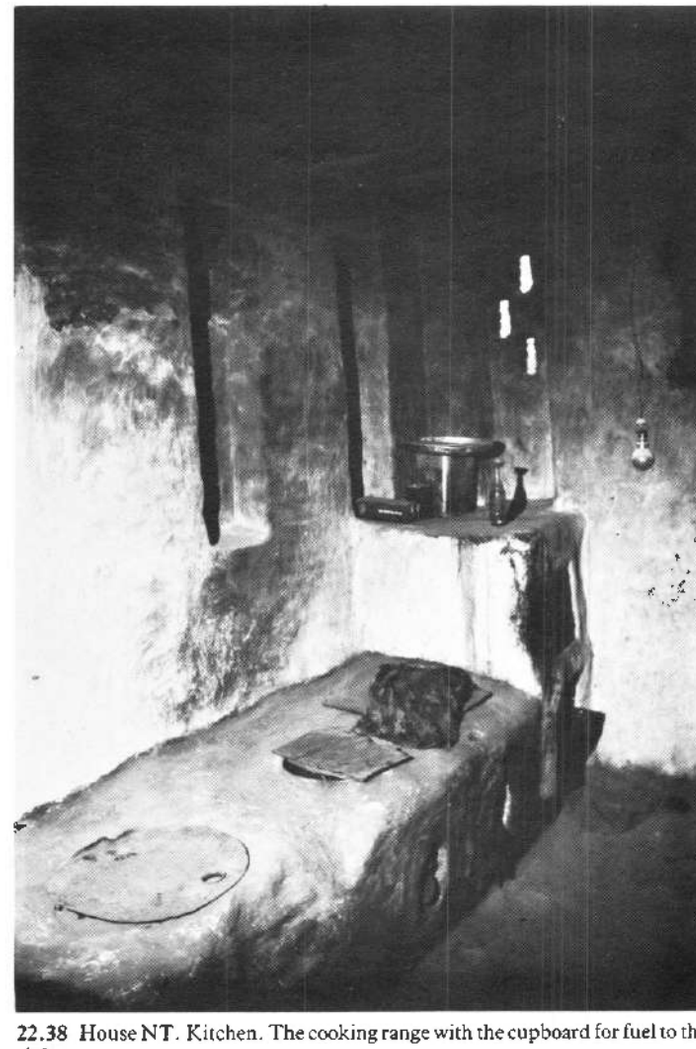


22.35 House NT. Lobby at second floor level, showing the communicating well to the lower lobby.

22.37 House NT. Lobby at second floor level, showing the richly decorated dado, and the stand for a water jar.



22.36 House NT. Lobby at second floor level with the entrance to the *dīwān* on the left.



22.38 House NT. Kitchen. The cooking range with the cupboard for fuel to the right.

22.39 House NT. Roof.

22.40 House NT. Ceiling of kitchen, showing the flue over the cooking range to remove smoke.

22.5). One or two large arches, built of exposed stones voussoirs, usually cross the entrance hall to support main internal walls on the upper floors.

The masonry shaft of the internal well passes vertically through one corner of the entrance hall, with a door to allow water to be drawn from it for animals. The remainder of the ground floor space is given to animal stalls, which are small close rooms with ventilation holes through the outside walls and man-height wooden doors from the entrance hall. A room for an animal within the house is called *al-kirs* and one says '*karras al-makān*', he made the room into a *kirs*. One room is given to the storage of fodder, and often another, low room, has a masonry bench with mills for grinding grain and salt built above it, approached up a short flight of steps.

The masonry room for collection of excrement from the lavatories above is also located on the ground floor, and emptied through a small low opening on the outside.

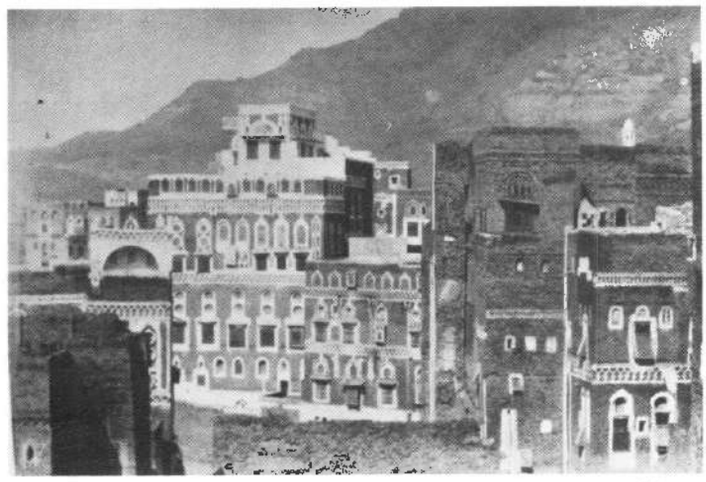
The Mezzanine level: Commonly this contains no living rooms, although there is one in the case of one very large old house (house S, plans, fig. 22.5). In this latter house, and in house B (axonometric, fig. 22.6) there is a guard room at mezzanine level which overlooks the entrance hall. It has a private sleeping room adjoining, together with a lavatory, in house B (pl. 22.55).

Most of the mezzanine space is used for grain stores. The wheat, corn, millet, or other grain, is placed in large open masonry bins called in some places *maḥqib* or *ḥijbah* with walls which reach to waist level and are *muqaḍḍaḍ*, i.e., covered with *qaḍāḍ*; these stand in rows down one side of each storeroom (pls. 22.48, 49). In some houses (e.g. house JY) the grinding mills are placed in rooms on this level instead of in the entrance hall (pl. 22.71). Occasionally, when there is not enough space below, animals are housed in some rooms on the mezzanine floor.

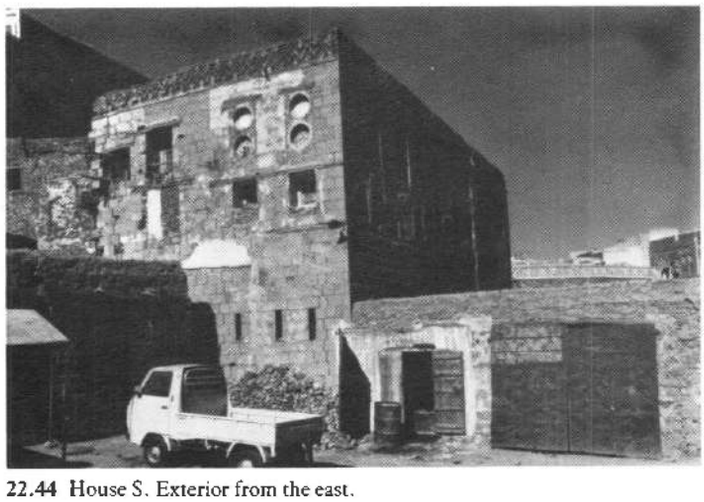
The staircase: Staircases in large houses follow the same pattern as those in smaller buildings, but are often more generous in width. The steps and landings are of stone, and have steep goings, that is, the steps are wide (33-38cm) but the risers are rather high (25-33cm). Nevertheless the twenty-three metre climb (house JY) to the top floors of these high houses is less arduous than it might seem to those who have never experienced it. Flights are short and landings frequent; there is considerable variation in the number of treads in a flight, the staircase space being made so ample that extra treads can be incorporated without difficulty, to allow ingenious changes to floor level.

In the walls of the staircase there are sometimes high wooden grilles which permit women on the floor above to watch who is on the staircase without being observed themselves (pl. 22.72).

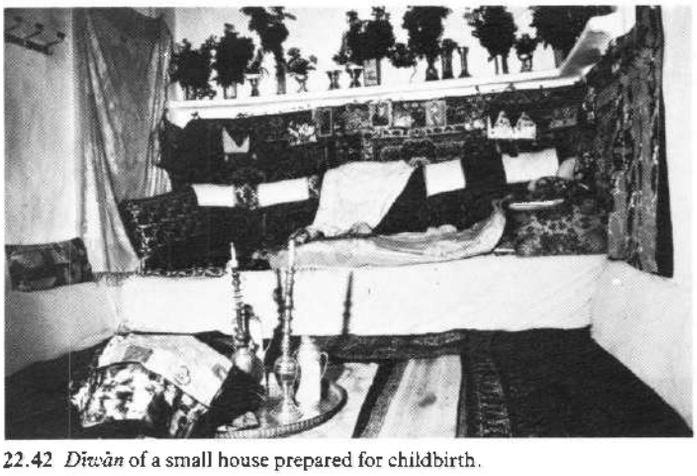
22.41 House NT. View from roof looking down on the *samsarah* at the rear of the house.



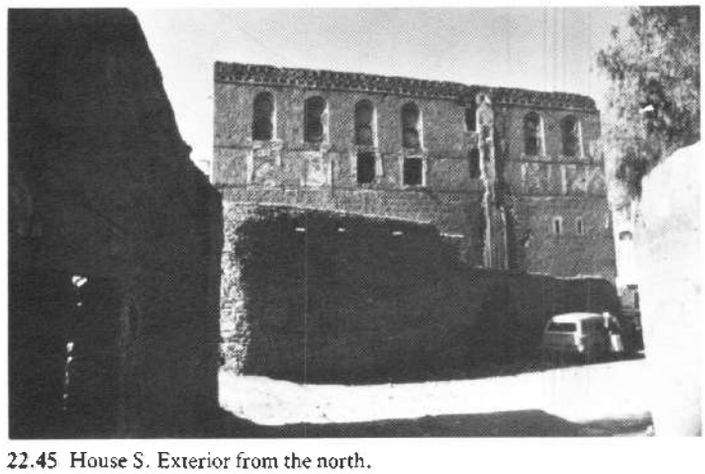
22.43 House S. A photograph taken by a Turkish medical officer, ca. 1900. (University Library, Istanbul.)



22.44 House S. Exterior from the east.



22.42 *Dīwān* of a small house prepared for childbirth.



22.45 House S. Exterior from the north.

The central stair pier in large houses is frequently up to two metres wide, and contains recesses in which guards used to squat to control movement up the staircase (pl. 22.50). At higher levels these recesses become cupboards (*khizānah*) built of masonry and closed with small doors.

A few big houses had double staircases. Some of these undoubtedly resulted from the incorporation of two houses together, but one, at least had a short staircase which turned inside the main staircase, to provide separate access, through a separate outside door, to a small room on the first upper level (Dār al-Ḥamd Palace). It is not known what the function of this room was meant to be, but it is possible that it was a room for transacting public business, hearing cases, etc., the double staircase ensuring that visitors were unable to have access to the remainder of the house.

Storerooms: Large houses often have another floor level of storerooms (e.g. H, fig. 22.7, and pl. 22.65). These stores, if for grain, are called *makhzan al-ḥubūb*, Ḥusayn al-'Amrī called one *mikhzān al-ṭaḥīn*, the flour store, but added that many other things are kept there like *qishr*, coffee, etc. Alternatively, there are rooms set aside as storerooms at higher levels in the house; these are called *ṭabaqah* if they are without windows.

The well: The well shaft rises either into the kitchen, passing through the entrance hall below (house BS), or it rises through the

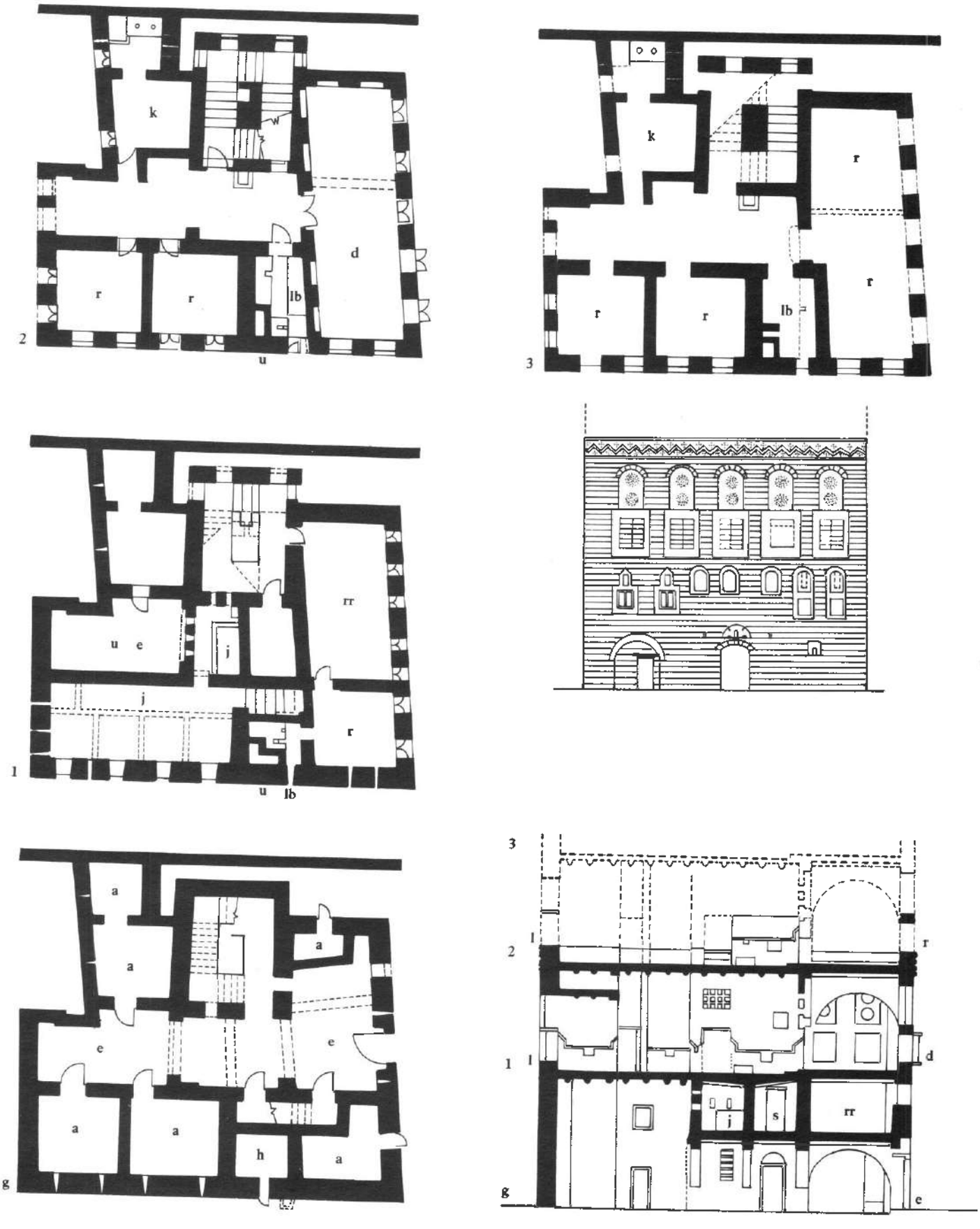


Fig. 22.5 House S. Plans, section, and elevations. The broken lines indicate the destroyed upper section.

main lobbies which serve to the *dīwān* and the upper living rooms, so that water may be drawn in the public circulation area on each floor level, as well as in the entrance hall (house S, fig. 22.5, and pl. 22.51, house JY, fig. 22.7).

The first living level: In large houses the lobby often becomes a grand hall, almost as wide and long as a *dīwān*, but lit by fine windows, in which the work of preparing food, drink, brazier and water-pipe for smoking may often be carried on (pls. 22.58 and 69).

The first large reception room is entered off the lobby, as well as smaller living rooms, possible a storeroom for food, drink and tobacco, and a bathroom-lavatory. One of the smaller rooms may be used regularly as a family eating room in which case it is known as *makān al-ghadā*.

The second living level: This is generally quite similar to the first living level in layout, type and size of rooms, and general appearance. The windows may be more splendid in material, colour and pattern than those below. The *dīwān* doors are usually kept locked, and are richly appointed and ornamented (pls. 75 and 22.73).

The dīwān and the family living room: These two rooms, almost always one above the other, are frequently very large, and are then crossed with masonry arches to strengthen the structures (pls. 60, 22.52). Generally, one end of the room is more important than the other, and is kept furnished with cushions, rugs and carpets; in the *dīwān*, this end is used for childbirth (pl. 22.42) and laying out the dead. In the case of the family living room, and of the *dīwān* when it is used for family gatherings and feasts, it is usual for older people to gather at the more important end with the young at the opposite end. Naturally when they are being used by the men, especially if there are visitors present, women do not use the rooms for eating or sitting. During feasts or when the rooms are being used for entertaining, the furnishings of the room will often be supplemented by the addition of a large brass tray carrying waterpipes, and by a brazier and spittoons—as described in the section on the *mafraj* below.

The windows of these two large rooms are occasionally splendidly decorated, the shutters of the lower, opening, section sometimes having different patterns carved on each shutter with bosses and fittings of ornamented brass or gilded iron (pl. 22.122). Sometimes a latticed box is provided, projecting from the building so that when women open the shutters to look out they cannot be seen from the street. Above there are large sheets of alabaster in fixed areas or double, plaster traceries, different in each panel, filled with brightly coloured glass in the inner panels (pls. 85 and 22.128). Older houses, like house S, have small circular areas of coloured glass tracery, fitted into spaces which apparently earlier held much larger sheets of alabaster (pls. 42 and 69), the remainder of the openings is blocked with additional plastered brickwork.

Important officials or big landowners who transacted business in their houses did so in a lower room specially set apart for the purpose (house AAO), or in the *dīwān*, as in house M, where one of the most important men under the last Imāms held court from a large sitting platform recessed in the middle of the long wall of the room; it clearly shows as an elaborately supported and decorated projecting bay on the facade of the house (pl. 22.104).

Alternative second living level: In very high houses the *dīwān* may be relegated to the third living level. In this case a suite of family living rooms is often interposed on the second living level. This suite may be used privately by the dowager mother of the household, by a close male relative and his wife and children (son, brother, etc.) or by the women of the household as a living and entertaining unit. Sometimes one of the rooms is used mainly for sleeping. Being self-contained, space is at a premium, and such floors are characterized by one or two low storerooms at a high level approached up narrow flights of stairs made of hard gypsum plaster. One of these is used as a wardrobe for storing large quantities of women's clothing (*makhzan kummah*);[6] it is usually over the bathroom-lavatory. If there is a second storeroom placed high up, it has a small workroom-store below it (fig. 22.9, pls. 76 and 22.94).

Some houses, such as house F, have a flight of stairs of this type leading to small upper rooms on the first floor level (pl. 70). In house H this flight is elegantly made of wood. The workmanship in this case is so fine that one suspects this to be a very old *minbar* from a mosque cut down for re-use in its present position (pl. 22.66).

There may be more than one self-contained suite in a large house or a palace. In suites of this type, built in the last century, a new idea was introduced, that of the *jamakān* (Turkish, *jamekyān*), a row of folding doors was fitted to separate a living room from a more private room behind it. Sometimes the *jamakān* doors have glass panels.

The kitchen level: On the second or third floor below the roof of the building is situated the kitchen, a slightly larger and more elaborate version of the kitchen than that in the average house. There is only one kitchen in the house, no matter how large the number of family units, and it is shared by the women. Food may, of course, be heated or re-heated elsewhere using braziers.

Large kitchens often contain a special low storage cupboard, built up of masonry, the *khizānah* (pl. 22.96).

In a few cases where the height of a house has been raised by the addition of extra floors, the original kitchen may end up well below the top of the building, indeed nearer the storeroom levels, but these exceptions do not alter the general rule. Reasons why the kitchen is normally on an upper floor include the seclusion of women, the need to serve refreshment up into the entertaining rooms, as well as down into the *dīwān*, and the desire to keep smoke and fumes as clear as possible from the windows of living rooms. In the few cases where the kitchen is low, a special well, the *siyyah*, may be provided to allow the smoke to escape.

One of the oldest large houses, Bayt Muṭahhar in al-Ṭāwūs Quarter, has a passage (*makhtā*) to the kitchen (*daymah*) with holes in it to let out the smoke. On the sixth floor (*al-dawr al-sādis*) of the house, the *siyyat al-daymah* or kitchen flue warms the rooms.

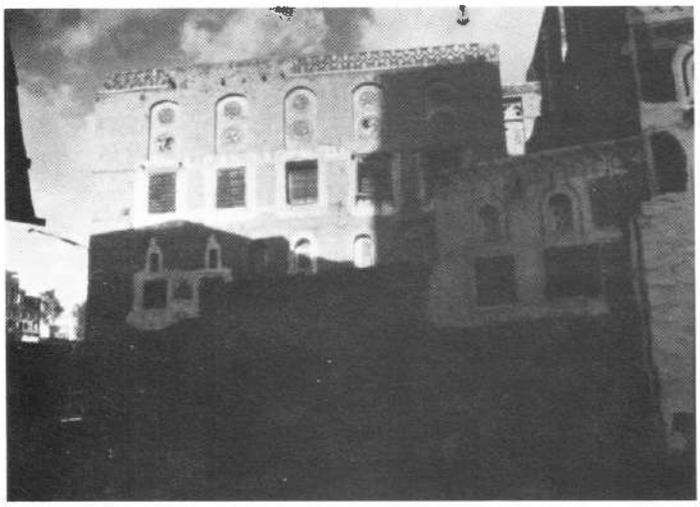
The kitchen, like the bathroom, tends to be placed on the north, cold, side of the house.

There may be a living room and storerooms used by the women and children on the same floor as the kitchen, or on the floor below. Sometimes the kitchen is on the roof of the main house structure, so that there are terraces opening off it, one of which contains the laundry. The kitchen may even be entered from an open terrace or courtyard (*shamsiyyah*) on the roof. The house normally continues upwards another floor or two, to the *mafraj*, but this top-most part of the building has a greatly reduced floor area.

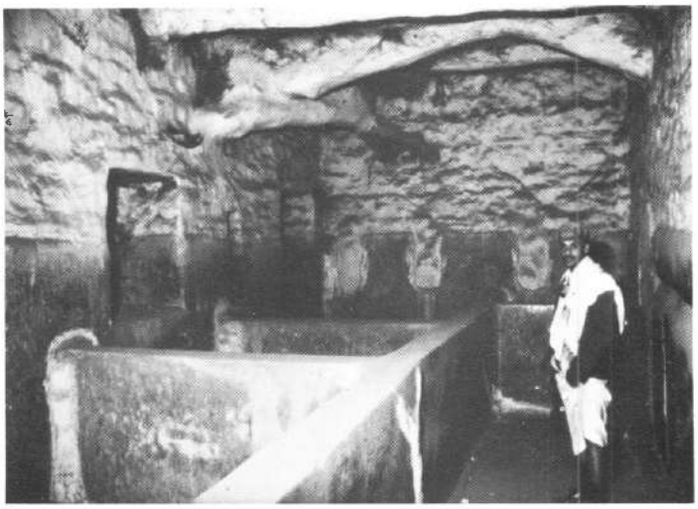
The laundry, described as *ghurfat al-ghasīl*, may be on an open terrace, or under cover (fig. 22.9, pl. 22.97). It consists of a deep, open reservoir for rainwater, which is collected from the roofs above and drains into it down a plaster spillway, and a hard flat plastered (*muqaḍḍaḍ*) or stone floor surface (*sāḥil*) on which the clothes are scrubbed. They are hung to dry on lines stretched across the terraces, or over the parapets. (A *sāḥil* can also mean a platform for drainage, or a drain down the side of a wall for rain or a lavatory, etc.)

The upper reception rooms: In a large house these focus around the *mafraj*, the large high room, with, on at least three sides, long low windows (*jarf*, sing.), used by the master of the house for chewing *qāt* and entertaining in the afternoons. But there are also other rooms for similar use. Often, one floor below the *mafraj*, there is a smaller version of the same room, perhaps with view

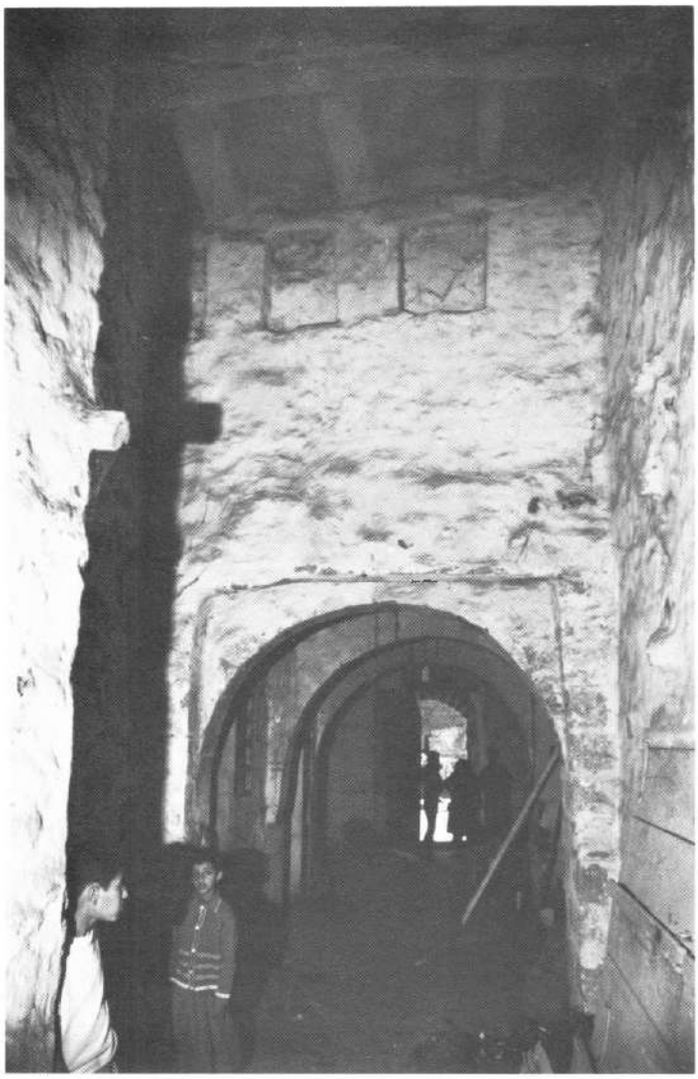
6 Rossi, *L'Arabo parlato*, 257, *piccole stanzette*; it has no windows (*nawāfidh*).



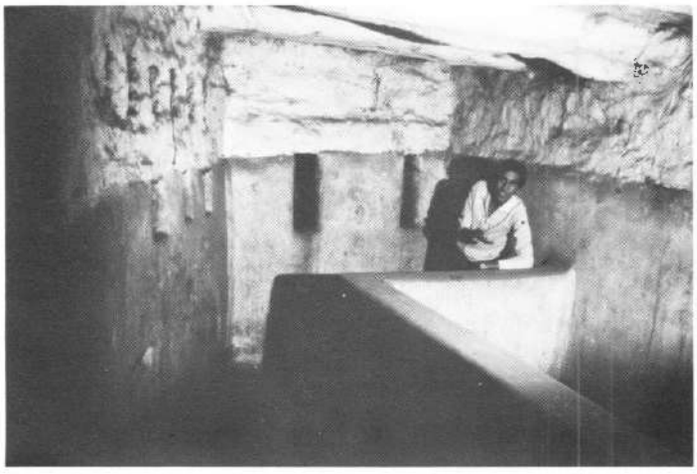
22.46 House S. Exterior from the west.



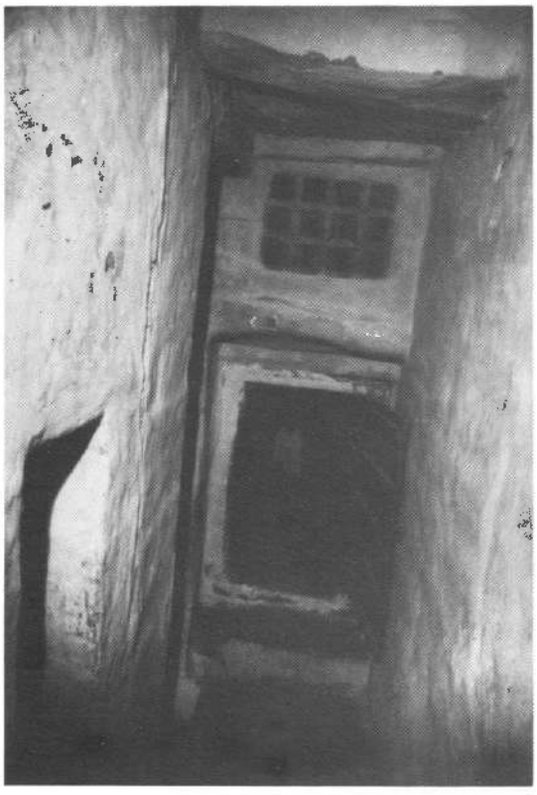
22.48 House S. Large grain store on the mezzanine above ground level.



22.47 House S. Entrance, with the entrance doors in the distance.



22.49 House S. Small grain store on the mezzanine above ground level.



22.50 House S. Staircase.

windows on only two, or even one, side. It is called the *manẓar*, the name used for the highest entertaining room of a smaller house. If it faces east, it may be called the *sharqiyyah*. Since the volume of the house rising above this level is smaller, this lower entertaining room often has a roof terrace outside it. Sometimes it is the prerogative of the women to use this room for entertaining when the men are not in the house, in which case the terrace is carefully screened with pierced masonry arcading.

In other cases the arcading is open and unscreened, meant purely for decorative purposes, but convertible into a complete screen by hanging drapes over it.

Above the *mafraj* there is in a few cases another level, comprising one small room, the *zihrah*. This is used by the owner of the house when he wishes to chew *qāt* or smoke alone, or with a small number of friends. The room is seldom more than two metres square, with a window on every side so that it enjoys magnificent views. In several cases, such as house B (fig. 22.6), it is situated on top of the staircase walls (see pl. 64).

In house B, and typically in large houses, the staircase continues unbroken from the bottom to the top of the house, a solid construction of stone with a massive central stone pier (*quṭb al-daraj*), acting as a kind of structural spine to strengthen the whole building. In some cases, though, the reduced size of the top two or three levels necessitates the inclusion of a new staircase serving them in a different position on the plan (e.g. house JY, fig. 22.8). In one large house (house H, fig. 22.7), the main staircase extends from first floor level up to the roof, but there is a separate wide staircase connecting the ground and first floors in another part of the plan.

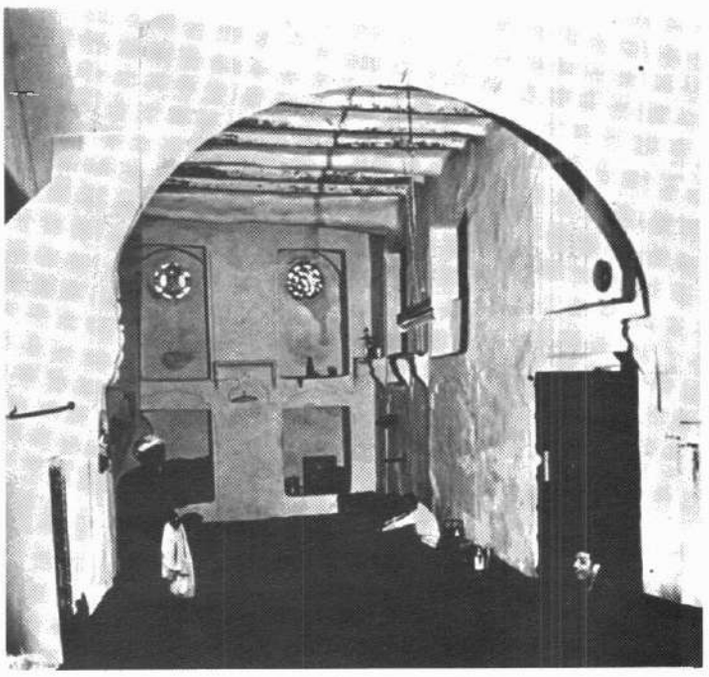
Under the *mafraj* there is sometimes a low floor containing a storeroom for grain and clothes, or a minor living room, called the *ṭabaqah*. It is characterized by small windows; its main purpose in this position seems to be to raise the *mafraj* as high as possible so that it may obtain better views (e.g. house JY, fig. 22.8).

Another small room near the *mafraj* is the *ka'mah*. This has only one window, and is a room used by an old person who wants to chew *qāt* alone. If the house has one, it is this room which is used for the dressing of the bride before her wedding.

The *mafraj*: (The word comes from *faraja*, it dispelled grief or anxiety.) This is the finest room in a Ṣan'ā' house.[7] It is usually approximately six metres long and four metres wide, with a lobby (*ḥijrah* or *ḥijrat al-mafraj*) four metres square continuing its volume at one end. The *mafraj* is a step higher than the lobby; it is separated from it by double folding doors. At the end of the lobby is a large window (*jarf*) closed by double folding shutters which open to almost the full width of the room. There is a large semicircular fanlight above (*'aqd*, sing.) containing alabaster slabs, or else gypsum plaster tracery in two layers spaced 10 or 15cm apart; the inner tracery is the only one of the two to be glazed, usually with brightly coloured glass, the outer layer unglazed. Similarly wide view windows are placed at the opposite end of the *mafraj* and in the middle of one long wall, and they have also semicircular fanlights of the same type over them. The remainder of the long wall has smaller openings with fanlights on either side of the main view window; the opposite long wall has usually high fanlights only, with decorated plaster shelves underneath to hold ornaments and articles for use in the *mafraj*. The shutters and doors are stained natural wood, except in the richest houses where they may be lacquered and decorated with paintings (pl. 53). The window shutters (*tāqah*, plur. *tiqān* or *tiyāq*, *darf*, plur. *durūf*) have often a little shutter within them (*shāqūṣ*, pron. *shāgūṣ*). Its opening has a decoratively shaped top edge which is effective against the light in silhouette (pl. 63). Frequently the elaborate plaster decoration (*naqshah*, *takhrīm* in San'ā',

7 A *mafraj* is also a room at the side of a garden with a *shādharwān* in front of it, see below. 'This *mafraj* is specially for the *qaylūlah* gathering when those sitting (there) chew *qāt*.' Cf. *Al-Amthāl al-Yamāniyah* I, 117. no. 322.

22.51 House S. Upper lobby.



22.52 House S. *Dīwān*, looking north, showing the inner wall. The reinforcing arch carried the cross walls of the floors above.

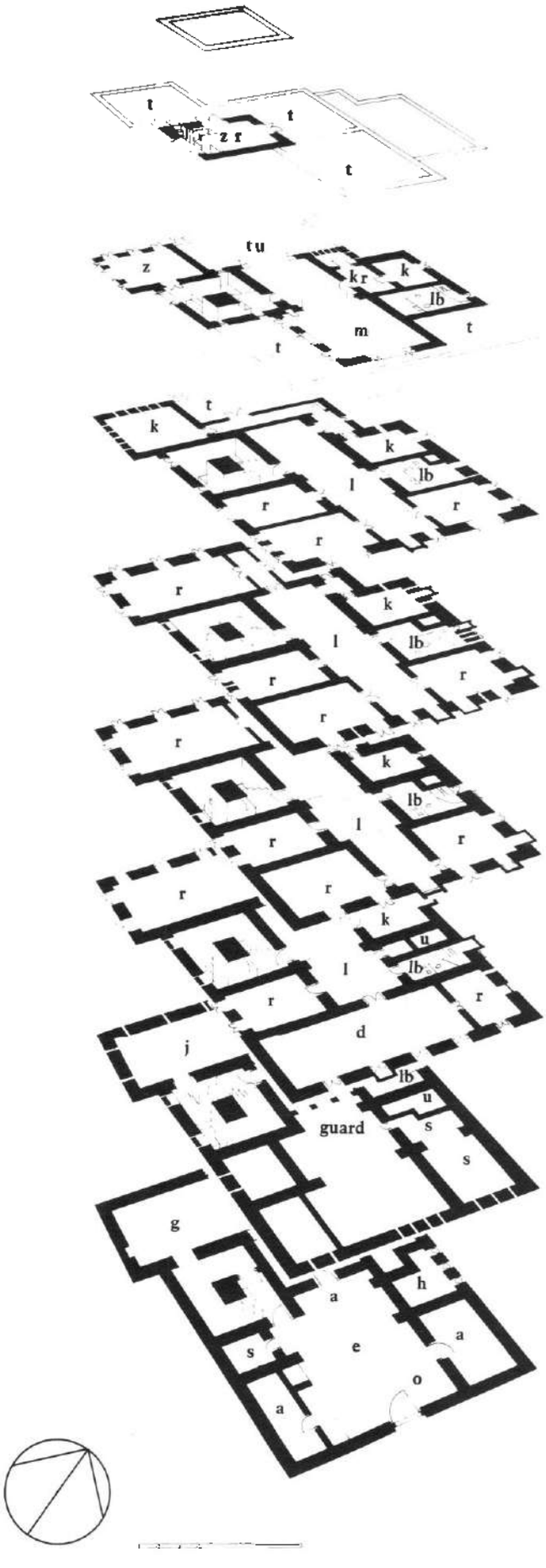
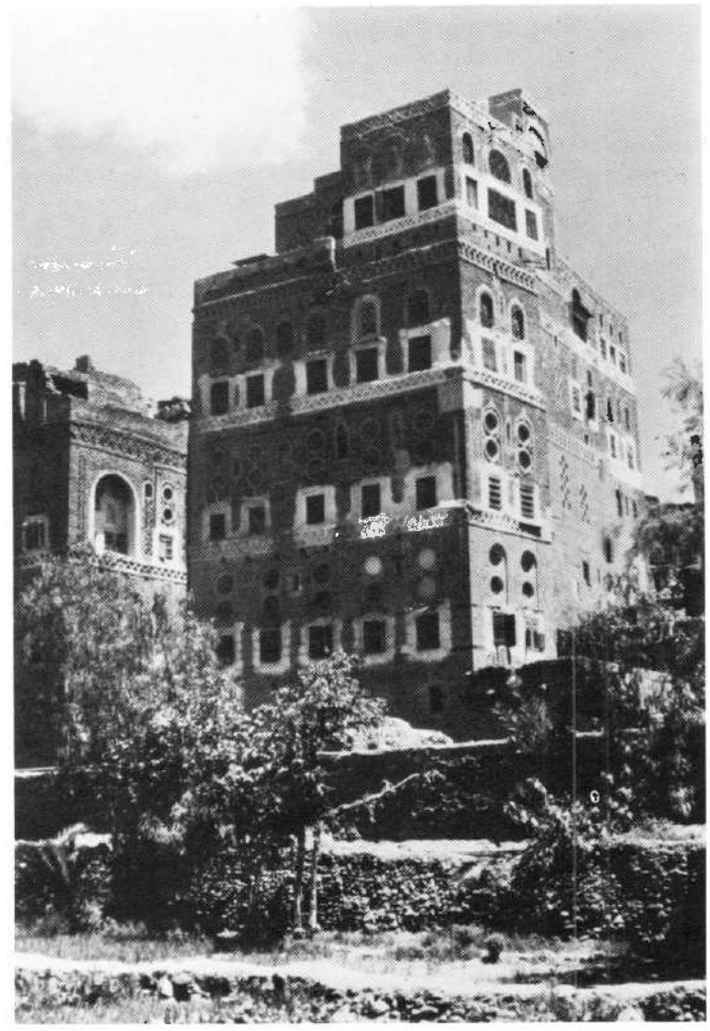


Fig. 22.6 House B. Diagrammatic plans superimposed in perspective.

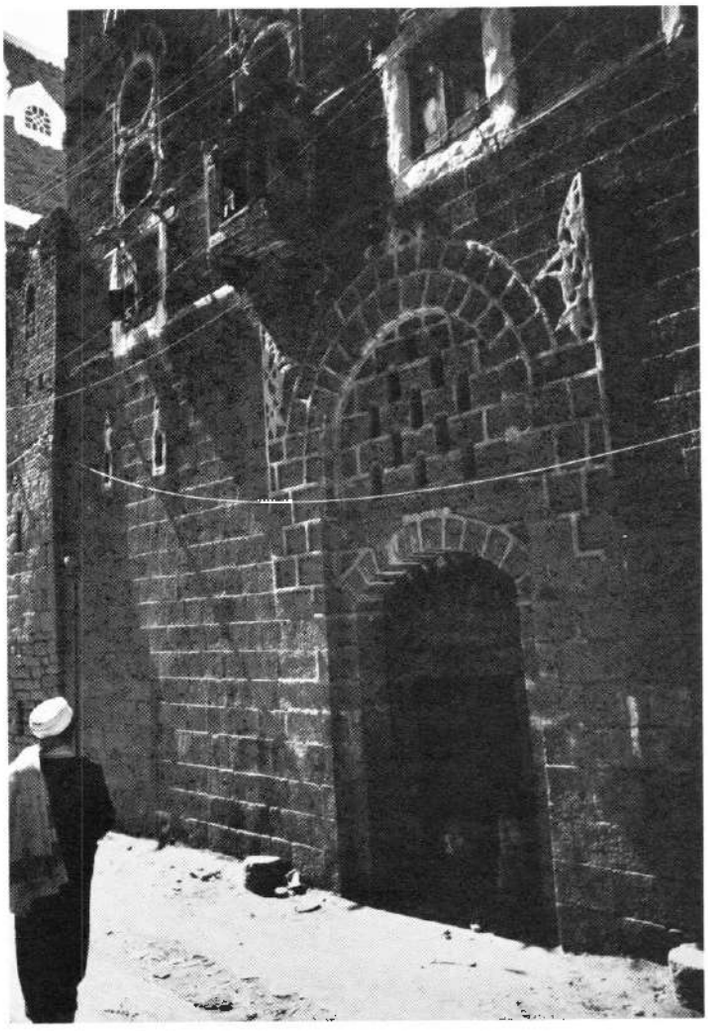


22.53 House B. Exterior

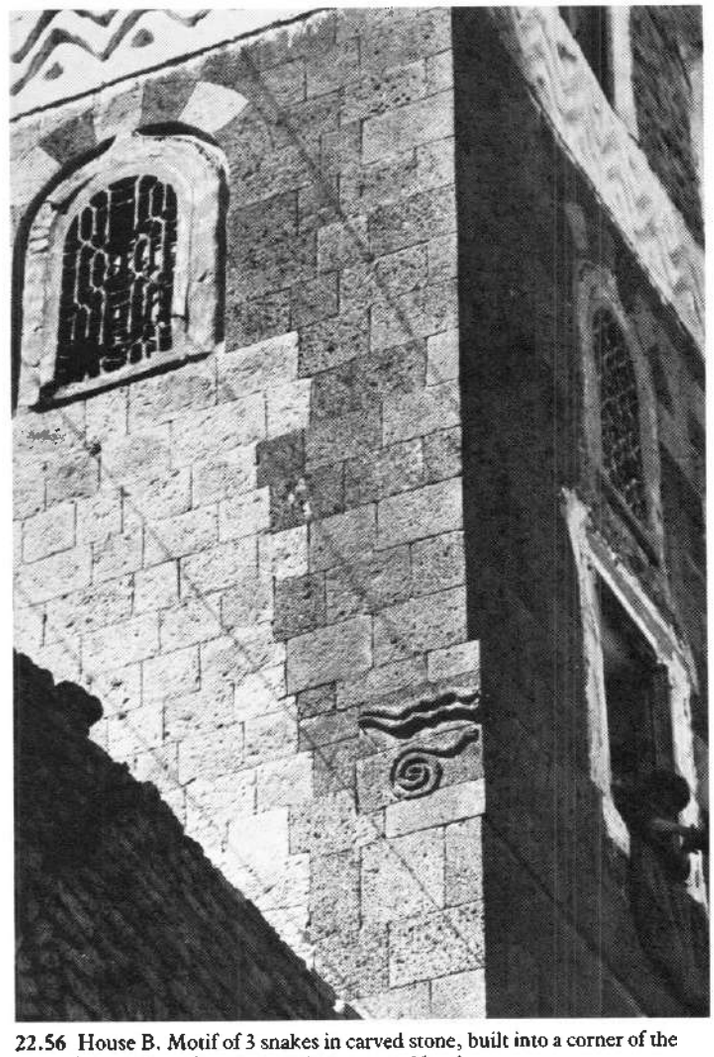
pls. 53 and 61) includes passages of poetry and verses from the Qur'ān, and in one case (house B, pl. 62) the owner's name and the date of the building of the *mafraj* are recorded. Typical is, as in Bayt Muṭahhar at al-Filayḥī, such a blessing as *'Izz yadūm wa-ni'mah lā yanqaḍī*, honour lasting, prosperity unending.' There are hooks for coats (*sils*) below the shelves. Small cupboards (*khizānah*) have richly decorated doors (house B, pls. 62 and 22.61). In the last hundred years sashes containing large clear panes have often been introduced in the window openings, either in addition to the original shutters, or replacing them.

The furnishings of the *mafraj* follow the traditional furnishings of all Yemeni living rooms, described above (p. 442a), but are usually of the richest possible materials. There is an expensive carpet in the central floor space (*mushamma'*). A circular brass or silver tray (*ma'sharah*) stands on the floor near the entrance to the room, and is filled with pipes, braziers (*mawqid*), jugs for water, incense burners (*mabkharah* for *bakhūr* incense) and spittoons (*madfal/matfal*) for use when chewing *qāt* (pl. 57). There is sometimes a high tray on a pedestal (*ṣaḥn al-ṣayānī*) with china cups for serving coffee. A low box which serves as a desk for writing may be brought in (*māssah*). Candlesticks (*mazharah*) sometimes stand on the wall shelves or on the brass tray.

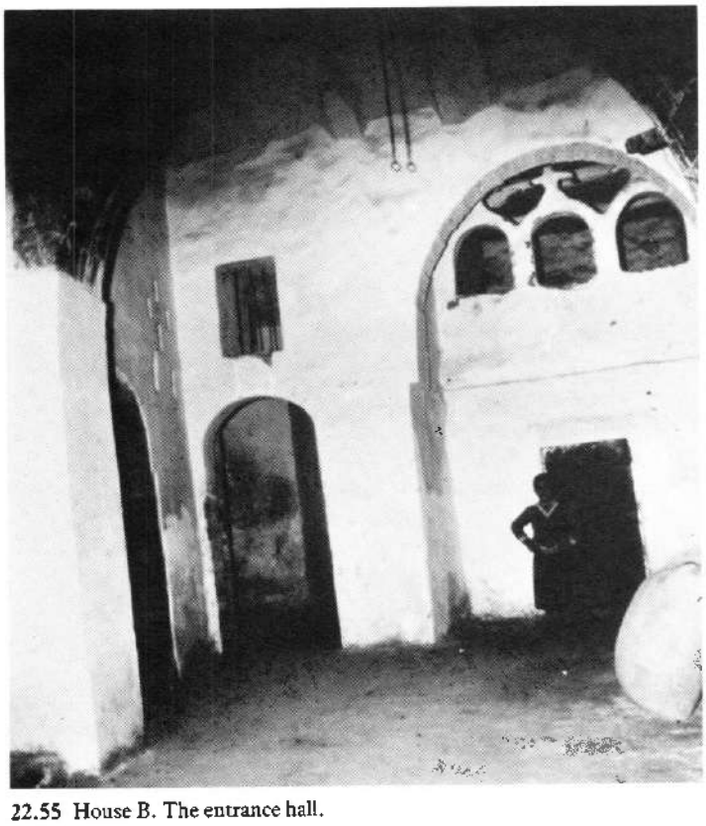
On the same floor as the *mafraj*, or on the floor below, is a lavatory for people using the entertaining rooms. There is usually in the lobby a large water cooling box projecting from the building, or even a special room with pierced walls built on the end of the building or on a corner of it, in which earthenware jugs of water are placed for cooling.



22.54 House B. Street facade, showing the entrance doorway.

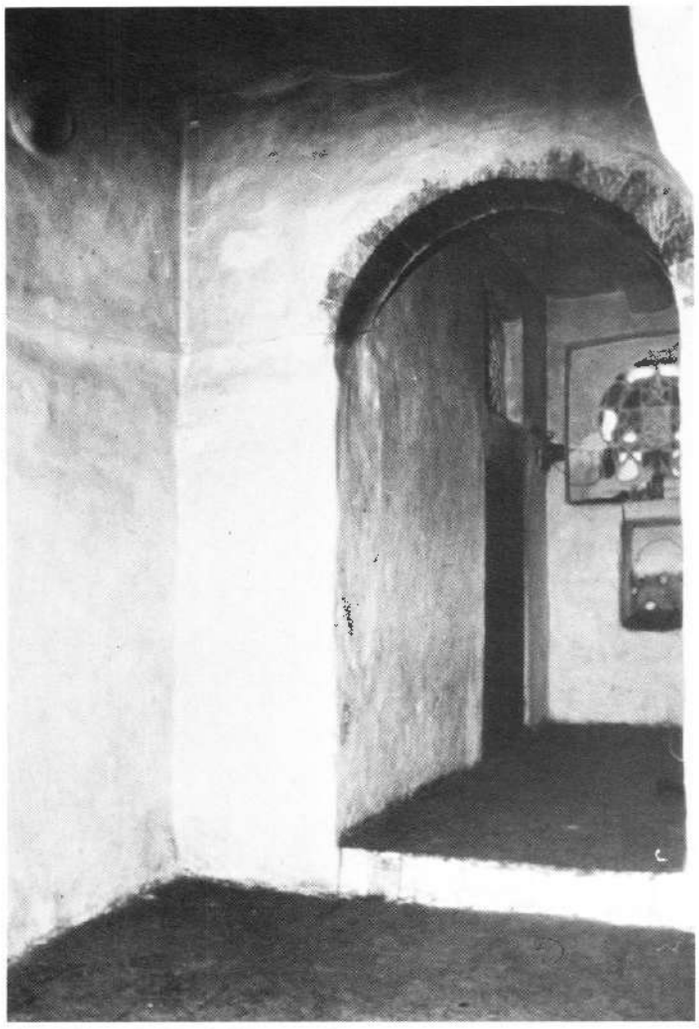


22.56 House B. Motif of 3 snakes in carved stone, built into a corner of the street facade about four metres above ground level.



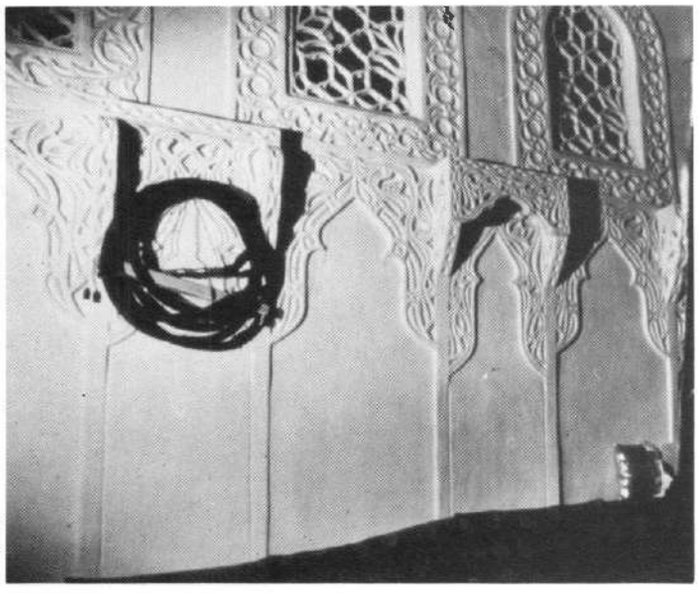
22.55 House B. The entrance hall.

22.57 House B. The staircase, showing the grilles which allow the women in the lobbies above to observe movement on the stairs.



22.58 House B. A typical upper lobby.

22.60 House B. The lobby to the *mafraj*.



22.59 House B. The *mafraj*.

In some older houses the room used as a *mafraj* is not a single room on a floor by itself, but is part of the main block of the house, sharing its level with several other rooms (e.g. house H, fig. 22.7 and pl. 22.63). One of the other rooms on the same level is called the *manẓar*. Other big houses or palaces preserve a similar group of rooms below the *mafraj* (e.g. house M, pl. 22.104), to which the name *manẓar* has later been transferred, although the largest probably served originally as the *mafraj*.

Window boxes of aromatic and flowering herbs are often provided for the *mafraj* and other entertaining rooms. Alternatively there may be a small garden of fragrant plants, mostly *rayḥān*, sweet basil, in pots on a roof outside these rooms.

Ideally, the long wall of a *mafraj* should face south, although east or west are alternatives sometimes accepted, for lack of better; but the Ṣan'ānī saying is, *'Mā bayt illā 'Adanī*, there is no room but one with a southern exposure.' The temperate climate of Ṣan'ā' means that protection against the wind is advisable on the sunless north side.

The Ṣan'ānīs, like Europeans have a house-warming known as *wakīrat al-bayt* when moving into a new house—the guest attending says *mabrūk* to the family.

Gardens and entrance courts: Large houses sometimes have entrance courts (*hawsh*, v. house H, fig. 22.7, pl. 22.63, house BT, fig. 22.9). On the street side these have high gateways (pls. 22.98, 105). Internally, the courtyard may be a small paved open space, or it may be planted with trees. Less often, there may be a back courtyard, sometimes planted in the same way. A small number of large houses stand apart surrounded by narrow gardens. These are always enclosed by high walls penetrated by a single gateway.

In view of the rarity of planted courts or gardens attached to the houses, it might be thought that in old Ṣan'ā' houses seldom enjoyed views from their windows into areas of plants and trees. This is far from being the case, however, as a great part of the city is devoted to large gardens (*bustān*) attached to the pious foundations (*awqāf*) for the maintenance of the mosques. There, vegetables and fruit are grown by the rentee farmer (*sharīk* or *bistānjī*), the *qashshām*, and these products are mainly sold

22.61 House B. The decorated door of the cupboard in the *mafraj*.

22.62 House B. Inside the *zahrah*.

directly to the houses encircling the *bustān*, the surplus going to the market. Thus the houses, more often than not, enjoy views over extensive market gardens which may be unsuspected by the casual passer-by in the narrow, masonry-lined streets and lanes on the other side of the buildings (cf. pls. 6, 8, and 49).

The gardens frequently appear to be sunk below ground level. This is sometimes a delusion, produced by the accretion of centuries of rebuilding along the streets, so that the buildings and the street level have been raised several metres. Sometimes, however, gardens are built in the bottom of claypits from which the material to make the bricks of the surrounding houses was taken; sometimes the market garden was dug below the level of water channels and *ghayls* to facilitate irrigation.

Palaces: There was little to differentiate palaces from the large houses of the rich, and in this section the two have been grouped together. Niebuhr mentions that when he saw it in the mid-12th/18th century the Mutawakkil palace (pl. 9.1) contained 'a spacious square chamber having an arched roof. In the middle was a large basin, with some *jets d'eau*, rising fourteen feet in height.'[8] This is the only recorded instance of an internal fountain in Yemeni domestic architecture.

The Islamic House - an Alternative Type

> The best building is one the court of which is wide, its ceiling high, its chimney tall and its ablution-privy far removed.
>
> (*Khayru 'l-abniyati ma 'ttasa'a ṣaḥnu-hu wa-'rtafa'a saqfu-hu wa-ṭāla madkhanu-hu wa-ba'uda mutawaḍḍā-hu.*)
>
> Al-Maydānī[9]

Not all houses have their *mafraj* on the roof; there is an alternative type, the *mafraj* with a reflecting pool and fountain at ground level (*shādharwān* or *nāfūrah*). As this takes up considerable ground area there are now very few of this type within the walls of the old city; of course there may have been more in an earlier period. In the garden suburbs of Bīr al-'Azab, Bīr al-Bahmī and Bīr al-Shams the larger houses and palaces commonly have a *mafraj* of this type,[10] though the richest may have another on the roof of the house as well. They are also found in al-Rawḍah, the resort of Ṣan'ā', 10km to the north, and to a lesser extent in other neighbouring towns.

A typical example is house G, near Bāb al-'Abīlah. This is a low villa which belonged to the Imām's family before the 1962 coup. Its *mafraj* and the adjoining pool and fountain are shown in fig. 22.10, pls. 22.106, 107. Although built within the volume of the house, this *mafraj* is characteristically not entered from inside the house; there is a separate outside entrance to it past the pool. An open arcade of lime-washed plastered brickwork shields the *mafraj* pool from the surrounding garden, providing a sense of enclosure. It is overhung by trees planted just beyond the arcade. A trellis for vines crosses over the pool and its central fountain, supported at the centre by two columns which rise through the water of the pool itself.

A large arcade frames a loggia which separates the pool from the *mafraj*; the roof above the loggia acts as a screened terrace for the private use of the women of the house.

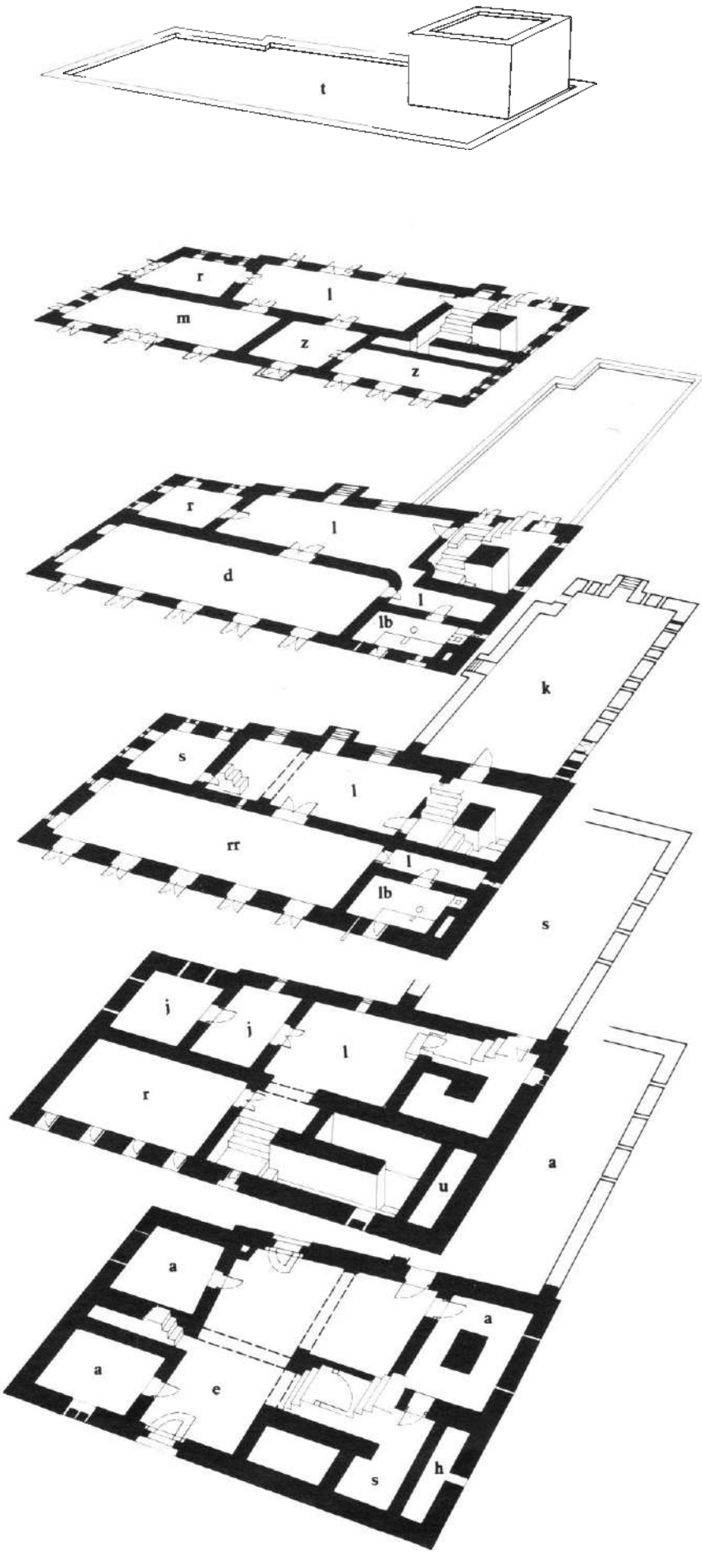
The *mafraj* is somewhat unusual in having a masonry bench along its rear wall, on which carpets and cushions for sitting are placed. Low cushions of the normal type are ranged along the side walls. It is possible that the purpose of this raised bench is to allow those sitting on it a better view of the fountain and water surface of the pool. However, this type of low *mafraj* does not always have the masonry bench, and there are one or two examples of the high *mafraj* which have it. *Dīwāns* in Jewish houses (see below) are frequently provided with such a bench. It obviates the need to build up the lying-in bed in the *dīwān* with hard mattresses (see pl. 58). A third possibility is that this is a feature introduced by the Turks, either during the first or the second Ottoman occupations of the Yemen.

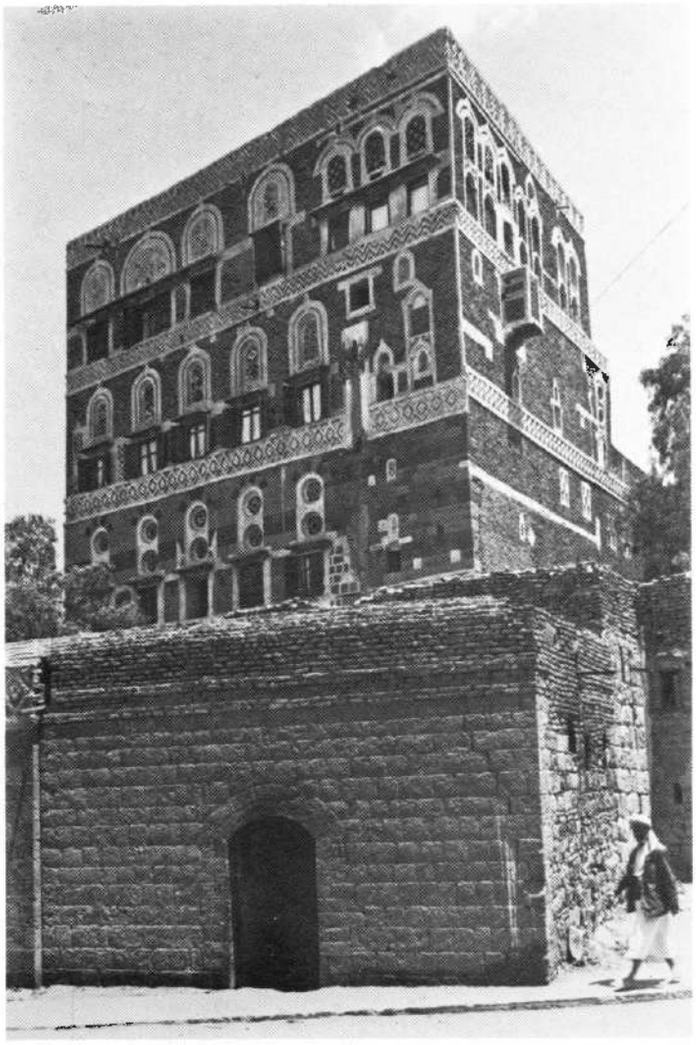
8 Niebuhr, op. cit., trans. Heron, I, 395.

9 G. W. Freytag, *Arabum proverbia*, III, 142.

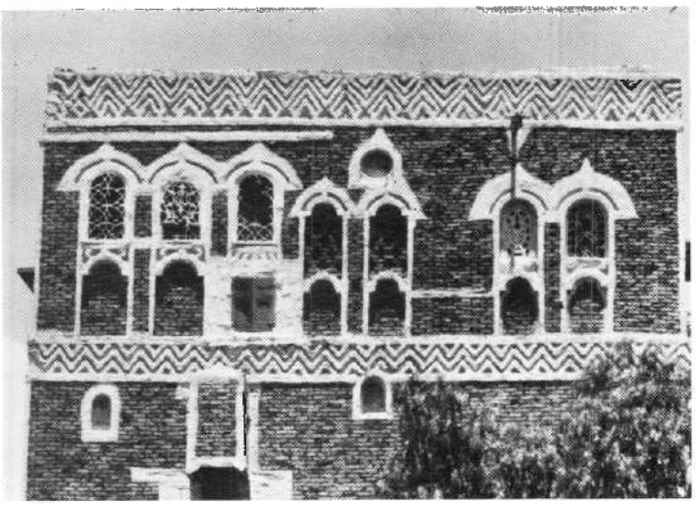
10 Such a house in Bīr al-'Azab is described by Niebuhr, who saw it in 1763. Op. cit., trans. Heron, I, 373. 'The Vizier's country-house was not large. It was even entirely open, upon one side. A number of fruit-trees grew in the garden. In the midst of it was a *jet d'eau*, similar to that which we had seen in the Imam's hall of audience. The water was put in motion by being raised in a reservoir by an ass and a man who led him.'

Fig. 22.7 House H. Exploded axonometric, showing the plans superimposed.

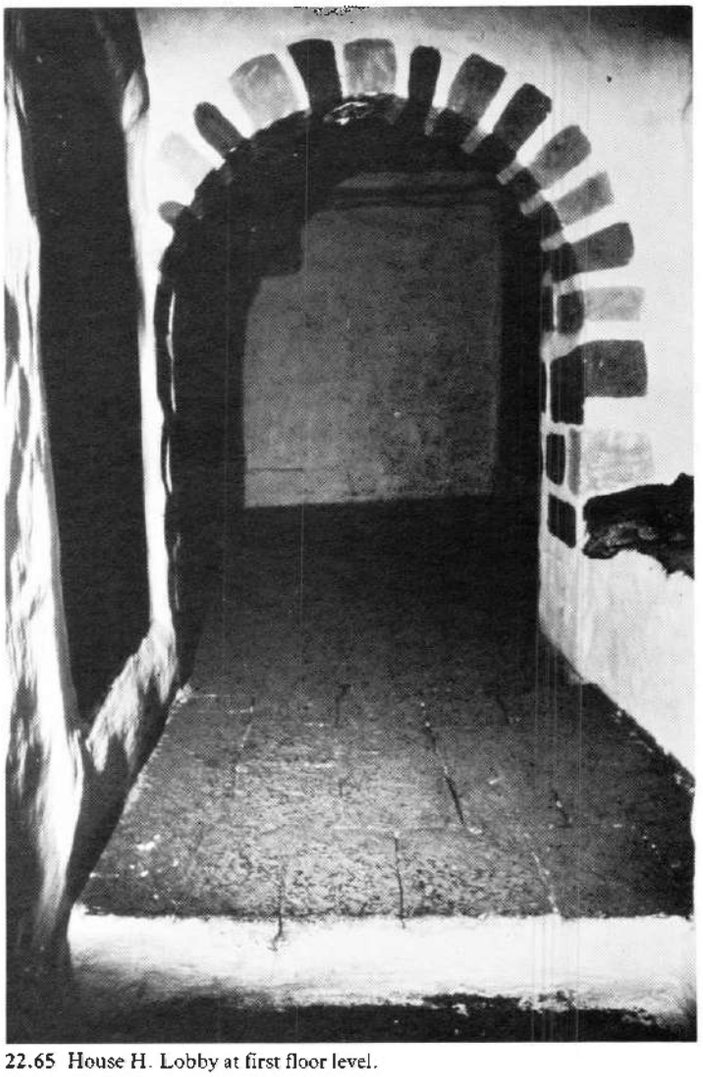




22.63 House H. Exterior. The house is set within a walled garden with an outer door serving as a gate.



22.64 House H. Exterior of upper storeys.



22.65 House H. Lobby at first floor level.

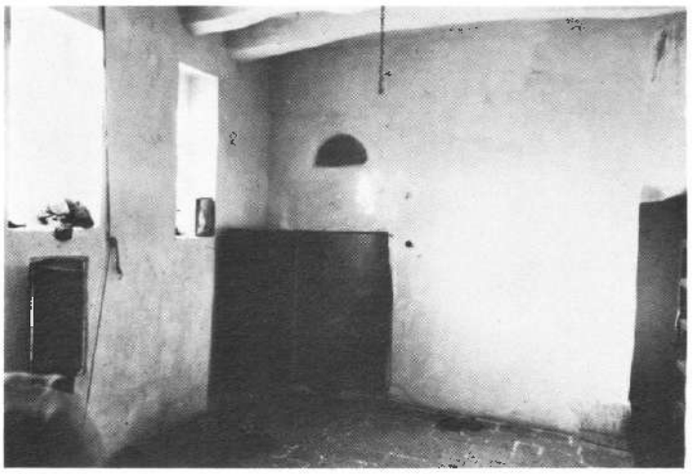
Other examples of the low *mafraj* are shown in pls. 79, 22.108-111, one an example from al-Rawḍah. The latter is again slightly a-typical, in having a second larger *mafraj* sharing the same pool, on an axis at right angles to the *mafraj* which is within the main volume of the house. It has a lobby higher than the stone surface around the pool, and the *mafraj* floor raised again, so that the inhabitants look down on the surface of the water. As though to emphasize this effect the lobby has a low wide horizontal window with its head at the waist height of a man; there are alabaster fanlights in the wall above, so that attention is focused on the water. The quality of this design should refute those critics who claim that Arabs did not traditionally appreciate subtle visual effects in architecture. No fountains intrude to disturb the pure geometry of the dark pool. Fields of vineyards lie beyond the terraces and the creeper-covered shrubs to the east and south.

The Relationship of the Ṣan'ā' Houses to Village Houses and Farmhouses

High houses of the Ṣan'ā' type are found throughout the mountainous central plateau of the Yemen and mountains to the north and to the east; they occur further north,[11] in the southern part of present-day Sa'ūdī Arabia, and further south and east in southern Yemen and Ḥaḍramawt. Although there are local variations in concept, especially in detail, the essential nature of the house does not change; that is, it has four or more storeys, the lower ones serving to house animals and storage, and the upper ones for habitation, with the most important entertaining rooms on the top level. There is usually only one door, and the house is simple and massive in bulk. Villages comprised of houses of this type may be seen within a few kilometres of Ṣan'ā', and

11 Ṣa'dah houses are discussed in Elke Niewohner-Eberhard, 'Das jemenitisch-arabische Innenhofhaus in Sa'da, Jemen' in *Der Islam*, 1977, LIV, ii, 177-204.

22.66 House H. Lobby outside main living room of house.



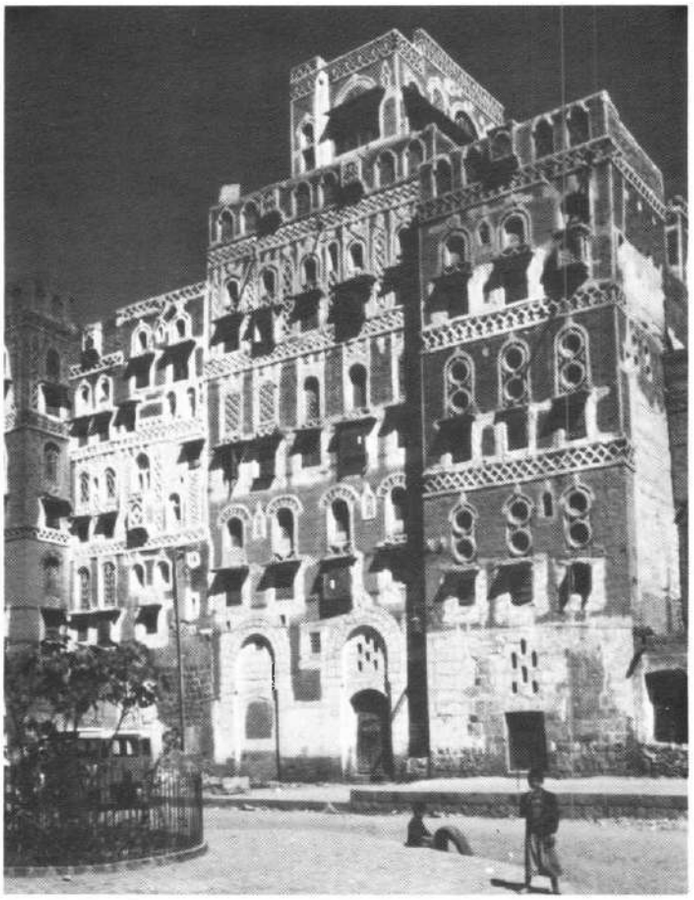
22.67 House H. Lobby outside *dīwān*. The staircase is visible through the doorway.

present just as urban an appearance as the houses of Ṣan'ā' itself. True, in villages only the most important houses will have squared, ashlar stonework in the lower storeys, and fewer still will have burnt brick above. More commonly, the upper storeys are of sun-baked brick, and the lower storeys of coursed clay (*zābūr*).

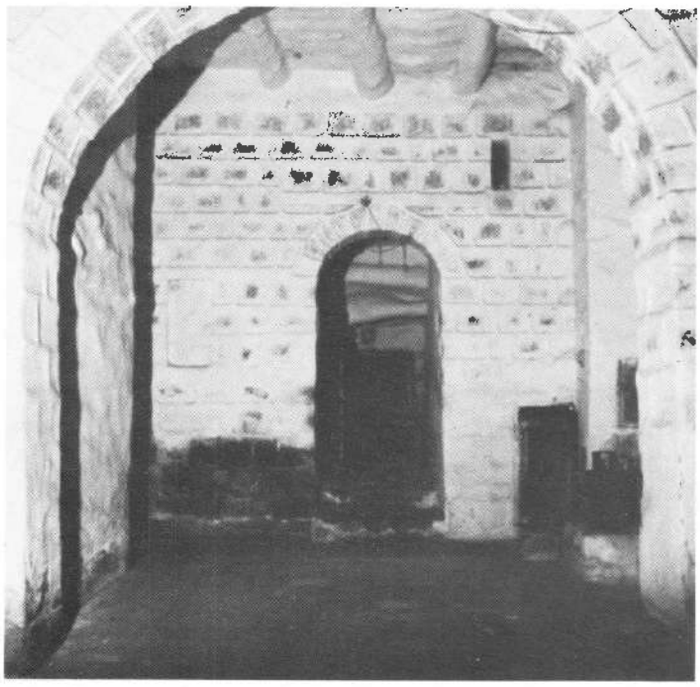
Farmhouses are often of the same type, but a different kind is also found, a cylindrical tower called a *nōbah/nawbah*. This appears to belong to an early tradition of building which has survived up to the present day, as similar structures in pre-Islamic or early Islamic cyclopean stonwork have been found in ancient sites.

The mountains surrounding the highland plateau afforded good shelter for marauding tribes who might at any moment descend to pillage the villages and farms of the agricultural areas. Throughout the region, circular defensive towers seem to have been used for domestic purposes. Some northern villages still retain clusters of them too numerous in number to have been part of a fortification system. It seems likely that the modern, square, tower-houses seen in farms, villages and cities are sophisticated descendants of such a prototype. An intermediate stage may be represented by the circular farmhouses which continued to be built until the present day. These will often have loopholes

22.68 House H. *Dīwān*.

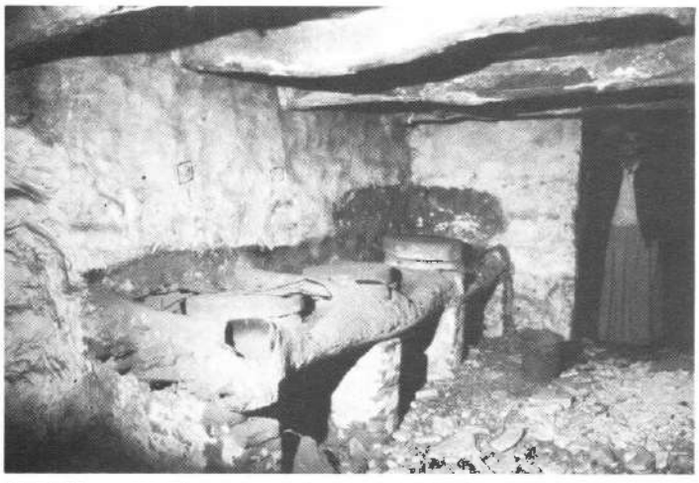


22.69 House JY. The front of the house facing onto a small *maydān*.

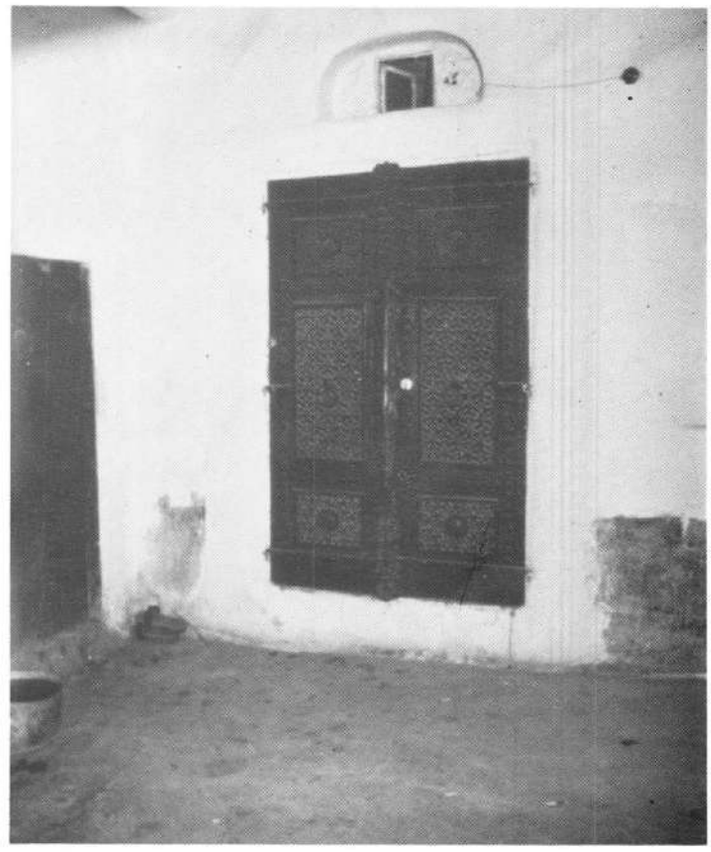


22.70 House JY. The entrance hall.

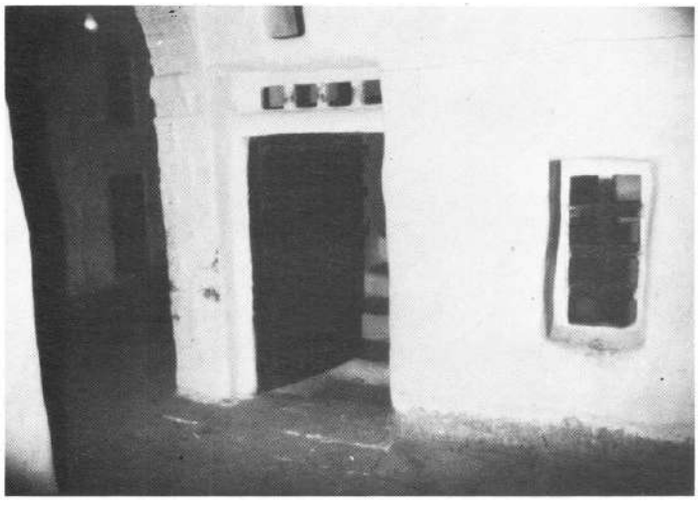
22.73 House JY. Doors to a rear *manzar*.



22.71 House JY. The querns on the mezzanine level.



22.74 House JY. The lobby of an upper *manzar*.



22.72 House JY. A characteristic upstairs lobby.

(*khuzqī*) for firing guns (*banādiq*).

Cylindrical houses of this type have been incorporated into Ṣan'ā' as it has expanded (fig. 22.11, pls. 22.112-6). In addition there are several constructed of ashlar stonework as part of palaces of the ex-Imām (pl. 19.87). It is difficult to be certain whether the latter were built for extra security in defence or for architectural variety.

An obvious advantage of the cylindrical shape of these houses is that it increases their stability, especially if they are built in soft coursed clay. In addition it is claimed by some of the inhabitants that many existing *nōbahs* were once much higher. Evidence of their strength may be seen in the fashion, perhaps of fairly recent date, of building a large square *mafraj* at the top, often

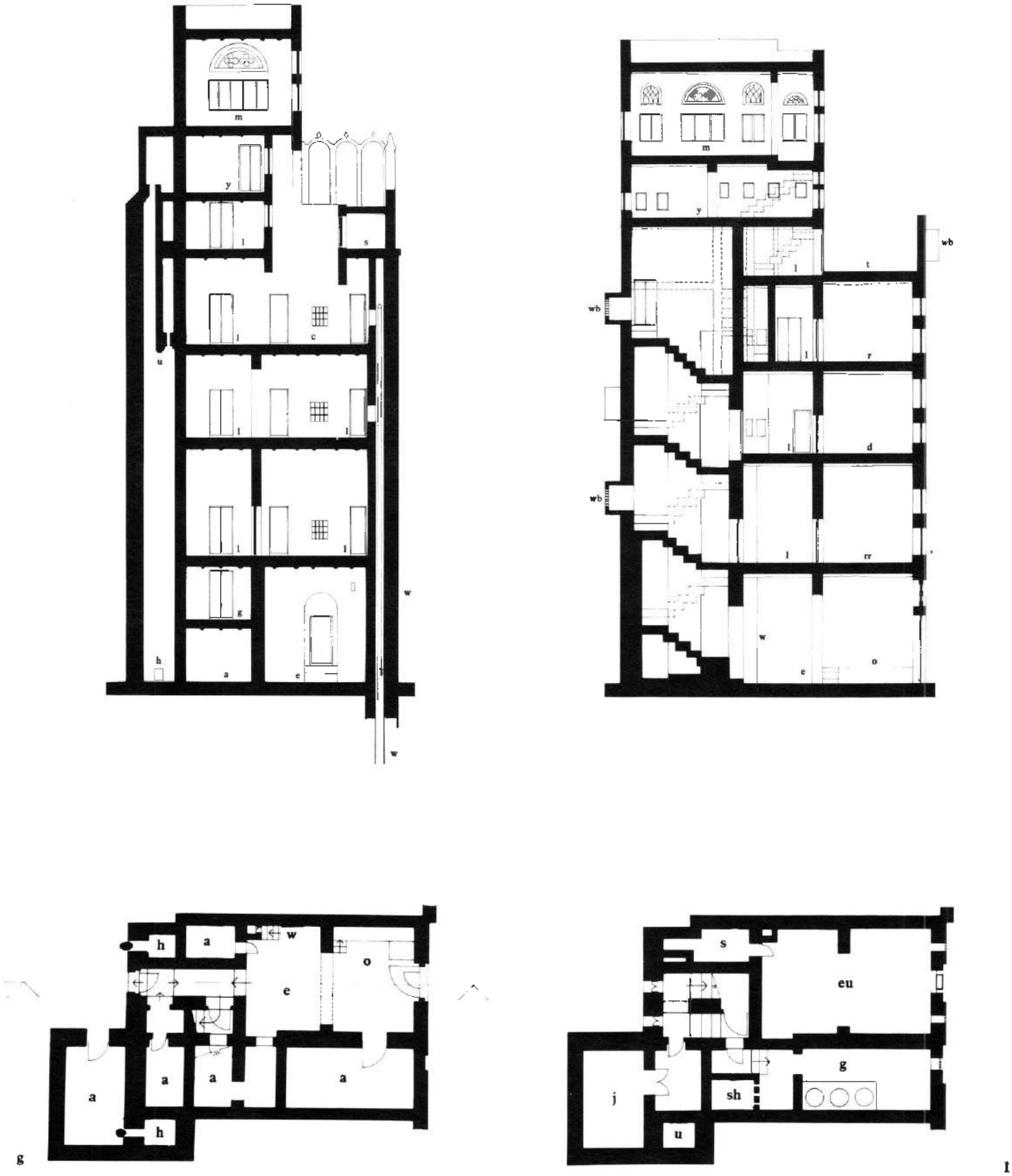
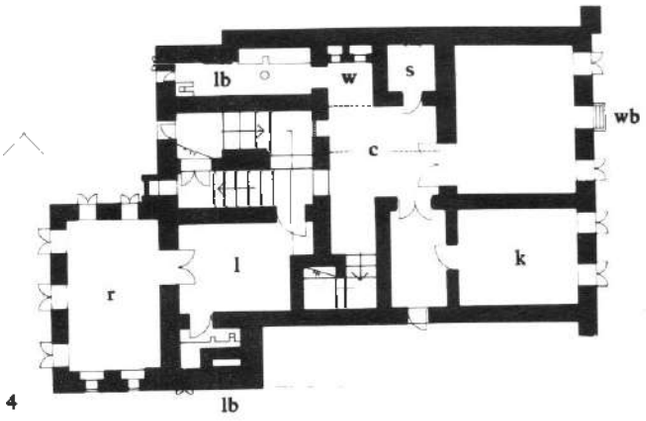


Fig. 22.8 House JY. Plans and sections.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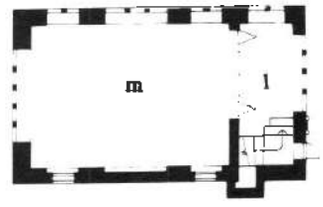
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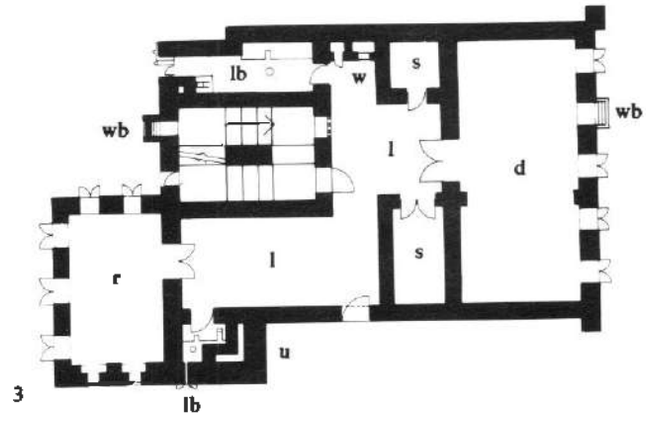
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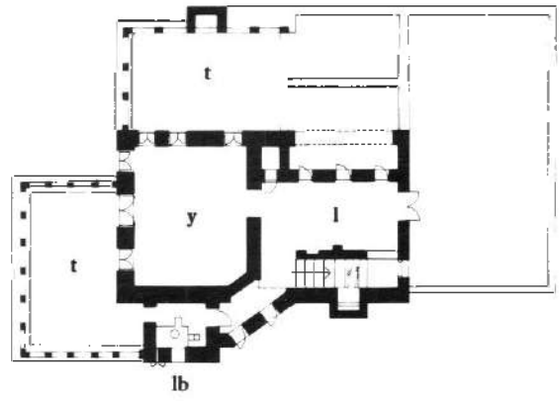
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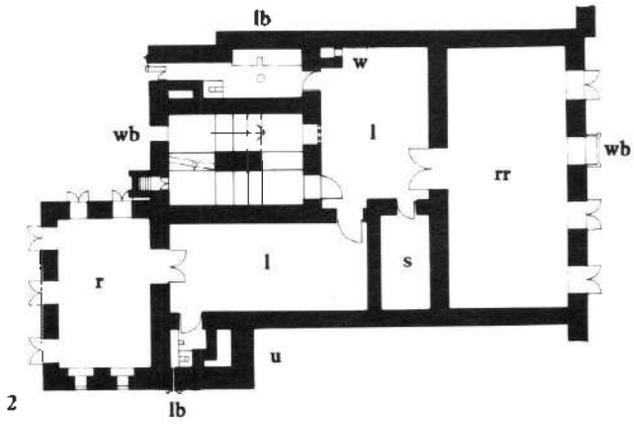
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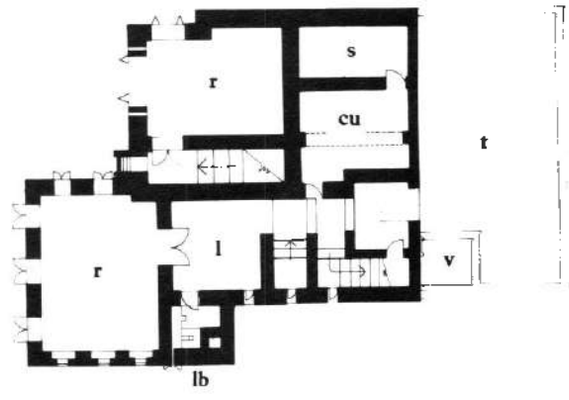
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cantilevered considerable distances beyond the sides of the cylindrical tower below (pl. 22.117).

The vertical distribution of the accommodation in a *nōbah* resembles closely that in the town houses. The entrance hall does not rise up through two storeys , but is limited to one, and the whole of the first floor is usually given to storage. More storerooms may be provided on the levels above. There is a *dīwān* for family occasions, sometimes a similarly large living room, with a small *manẓar* at the top, flanked by a kitchen, or with one on the floor below.

Construction

The lower levels of the buildings are usually constructed of square ashlar up to between three and ten metres above ground level. The blocks are shaped from broken stone on the spot by masons (*muwaqqiṣ*),[12] men or boys, whose special task is preparing the blocks. Each worker squats behind a shelter to stop stone chips from hitting his neighbour, holds the stone in one hand and strikes fragments off the surface with the sharp edge of his adze-like hammer (*mifras*) (pl. 22.118). They earn a standard rate for each block, and are among the best paid workers on the building site.

There are two types of agreement between the person who commissions building work and the labour or builders. Where a contract is made for a piece of work to be executed for a fixed sum this is called *'amal muqāṭa'ah.* The other is called *al-mushāqāh* which is an engagement by the day from early morning to sunset (*al-'amal bi-'l-yawmiyyah, min al-ṣubḥ ila 'l-maghrib*). This period is naturally longer in summer than in winter, but no account seems to be taken of this when it comes to wages. In the summer of 1972 workmen on the house knocked off round about noon and chewed *qāt,* returning to work some time between 2 and 3 p.m.

The description of the various qualities of cut stone was provided by 'Alī Ḥizām al-Ṣabāḥī of the Department of Public Works. It is curious that *Qānūn Ṣan'ā'*[13] (section 36, i) makes no reference to these different standards though we know from Ḥabshūsh[14] that Imām al-Manṣūr 'Alī (before 1224/1809) would spend a *riyāl* on a single stone of *Ḥabash* for house-building, in hewing, trimming and building wages (*fi qaṭ'i-hi wa-tawqiṣi-hi wa-shaqā 'amārati-hi*).

1 *Rub' waqīṣ* - the surface of the stone in the middle is left rough and not finished off. The edges of the block are rough and not exact, but the corners are square.

2 *Nuṣṣ waqīṣ* - well finished, with pecking (*naqr*) on the surface. This is executed with a *fās,* in Ta'izz called *shurnī,* a form of chisel for *naqr*-work. There is a *fās li-'l-ḥaṭab,* for firewood, and a *fās li-'l-waqīṣ.*

3 *Waqīṣ kāmil* - smooth square (*murabba'*) blocks, well made, with a good edge, but when used in building a little *quṣṣ* shows between the edge of each stone and the one next to it.

4 *Waqīṣ laqf* - stone so finely joined, one block to the next, that a needle (*ibrah*)[15] cannot be inserted between them. An example of this is the masonry of the new Dār al-Ḍiyāfah.

The following list of types of stone used in building construction makes no claim to be exhaustive. *Ju'm* is black basalt stone used for foundations (*asās*—al-Hamdānī[16] gives the term *mawthar,* still used today) under ground level, in rubble form or squared. It is hard (*ṣalbah*) and unaffected by salt or damp. Outside Ṣan'ā' it is often oval (*mukawbal*) or round (*mudawwar*). A brown ignimbrite[17] stone is also sometimes used. A hard black crystalline basalt (*ḥajar aswad, al-ḥajar al-sawdā',* or simply *sawdā'*) is used for the first courses above ground, squared (*muqalfa'*). It is used also to prevent salt, from which it seems to be impervious, from rising into the structure. *Ḥabash* is a blue-grey stone, a slightly pumice-like vesicular scoriaceous basalt, easy to work but hardening rapidly on cutting, quarried at al-Jirāf north of Ṣan'ā'. It is used for the walls, jambs and lintels of the lower storeys of Ṣan'ā' buildings, but not for the foundations or thresholds, as it is easily worn and likely to be attacked by salts. *Ḥabash Dhamārī* is famous. *Shalf/shilf* is rough untrimmed stone used for the interior side of the wall, not the facing--it is used as rubble. The rough interior stone part of a wall is called *tarbī'ah. Ḥajarah Ḥushayshiyyah* comes from Banī Ḥushaysh and *Ḥajarah Sayyāniyyah* from near Jahānah. 'Aṣir/'Aṣar provides a light coloured stone and a darkish stone. Writing in the twenties, Nazīh al-Mu'ayyad[18] says that white stone is brought from Nuqum, and black from al-Jirāf mountain west of al-Rawḍah. They bring black volcanic stone, he says, from 'Aṣir or al-Sinaytah west of Ṣan'ā', which is harder than al-Jirāf stone. For decorative bands or patterns two other stones are commonly employed, *ḥaraḍ,* a grey limestone more often used for carved oil lamps and cooking pots, and *balaq,* a creamy white limestone on which inscriptions are carved as they were in the pre-Islamic age—the word itself is ancient. It is also now used for carving fine stone mills for domestic use. Another white stone is *Ḥajarah Sa'wānī* from near-by Wādī Sa'wān. *Ṣawra'* or *ṣamm* is a stone without holes. Tufa is also found, a pale buff volcanic stone which is easy to work but hardens on exposure to air. Other limestones used for ornament are green and dull red in colour, the latter called *'ithribī* after a plant with flowers of this hue. Stone is usually called after its colour and/or place of origin.

The extra large stones in the masonry of a house at the corners are called *midmāk* (*madāmīk*).

Walls are normally made with a facing of stones inside (*mathnā*) and out (*ḥajar al-wajh*), 20cm square or larger, with a central core (*raṣṣah*), usually between 3 and 10cm thick, of clay plaster and aggregate (*shalf*). One way of determining the height of each stone is by the span (*shibr*) of a man's hand. Although perfectly rectilinear on the face of the wall, the stones are rougher behind, and have a slight taper as their surfaces recede from the face. This means that a new course of stones (*sir'* or *ḥabl*) has to be propped at the correct angle with a wedge of soft gypsum plaster *quṣṣ* (pronounced *guṣṣ,* also *gaṣṣ/jaṣṣ/goṣṣ*)[19] which shows as a fine white joint, approximately 1mm high and later the space between the inner and outer rows of stones is filled with clay plaster mixed with crushed stone (*kabsah*) before the next course can be begun (pl. 22.119). Such a stone wall is at least 45cm thick, approximately a *dhirā',* the building unit, which is generally 47.5cm. On the rough inner facing of stonework a plaster surface is obligatory, *al-quṣṣ fawq al-mathnā.*

To the outside faces (*wajīhah*) of the external wall are tied the crosswalls (*qāṭi'ī,* pl., *qawāṭi'*), by which plan the area is divided into easily roofed sections approximately three metres wide. The system is one of the two devices by which the stability of the structure is assured, the other being the strength of the staircase pier, usually built throughout its height in stonework. Both the external faces and the staircase pier are built using gypsum mortar for extra strength.

The inner faces (*mathnā*) of the external walls support the floor, roof beams and lintels. The building of the external and internal faces of stonework is carried out by two entirely different

12 Verb *waqaṣ, yūqiṣ.*
13 See pp. 227a.
14 *Travels,* Ar. text 104.
15 Azraqī, 89, cited p. 45b, uses the same expression, but one cannot take it literally.
16 *Iklīl II,* ed. Akwa', 8.
17 Ignimbrite.
18 *Riḥlah,* I, 133, II, 14.
19 *Quṣṣ* (cf. Lane, Lexicon, *jiṣṣ*) gysum. It means in Ṣan'ā' plaster in general.

22.75 House JY. A bathroom and lavatory.

22.76 House JY. The outside of the *mafraj*.

22.77 A typical *dīwān* in a Ṣan'ā' house.

22.78 House AA. The *mafraj*.

trades, while a third trade builds the central rubble core (*raṣṣah*) of the wall.

Cross walls are usually built of rough rubble (*shilf*). They may be interrupted by large arches or door openings without their essential strengthening function being impaired.

Rubble stonework is also used in cheaper work, for storehouses or rear walls. It is usually coursed. Broken sandstone, limestone, rhyolite or basalt is used. Slightly better walls of this type employ roughly squared stones which are then brought up to level courses by thin stones inserted before the next row of squared stones is laid. A formalized version has alternate layers of thick and thin rectangular stones.

In the old stonework, such as that of the Great Mosque (pls. 18.5 and 6) and some older houses, each stone course leans outwards at a slight angle, so that the top edge of each row of stones projects about 1cm beyond the bottom of the row above it. This is known as *al-binā al-'aslah* (see p. 325b).[20] Although the wall

20 One of the other places where we noticed this *'aslah* work was in one or two patches of the Ḥawsh al-Waqf in which the camels that brought the incoming grain and fodder (*wārid al-ḥabb wa-'l-'alaf*) used to stop, and the Waqf supplies were then stored in this ancient place. A *zahrat Ḥabash* from the Great Mosque was built into a wall—a stone with four projecting rings. The Ḥawsh is in Ḥārat Yāsir.

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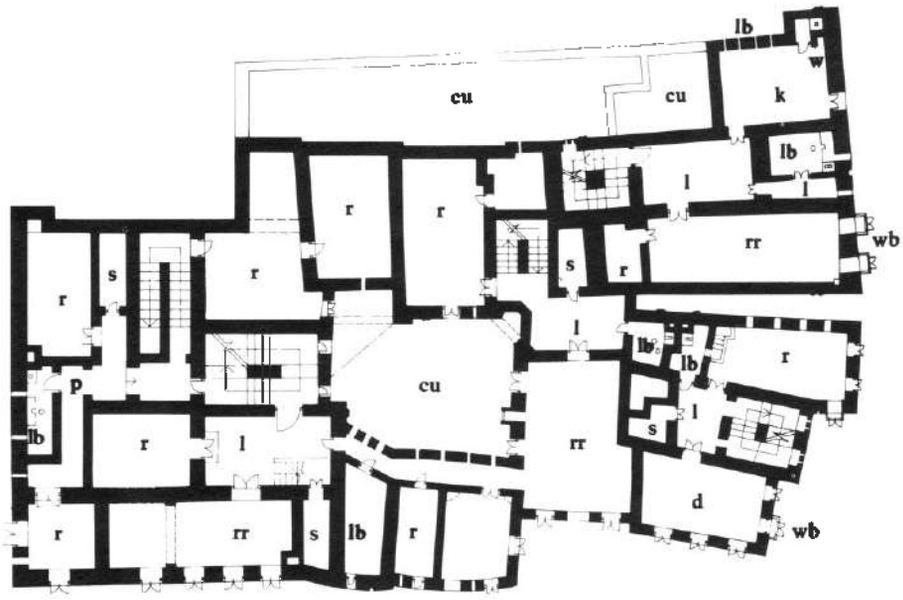

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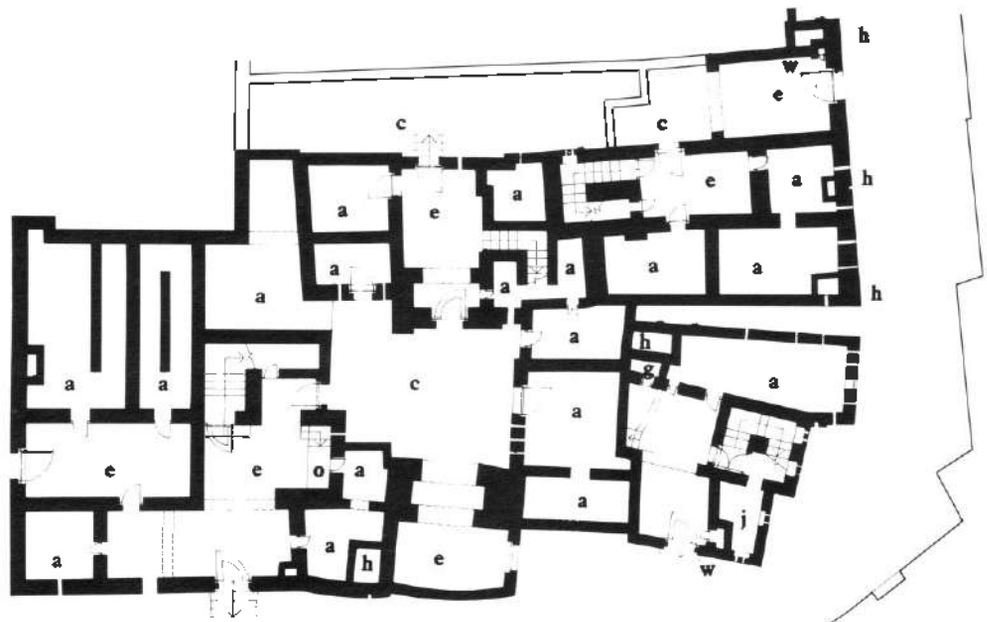

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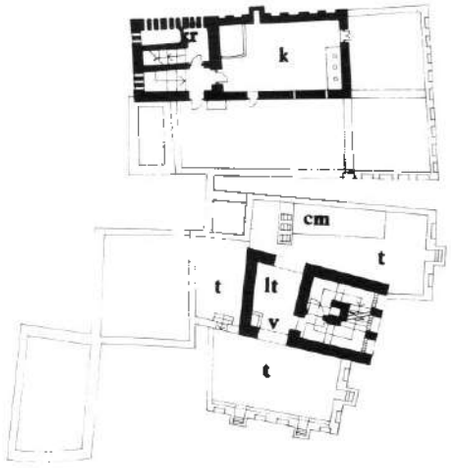
Fig. 22.9 Houses F, A and BT showing the way in which they cluster together, in plan and section. (Not fully measured.)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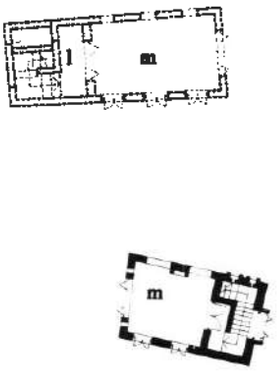
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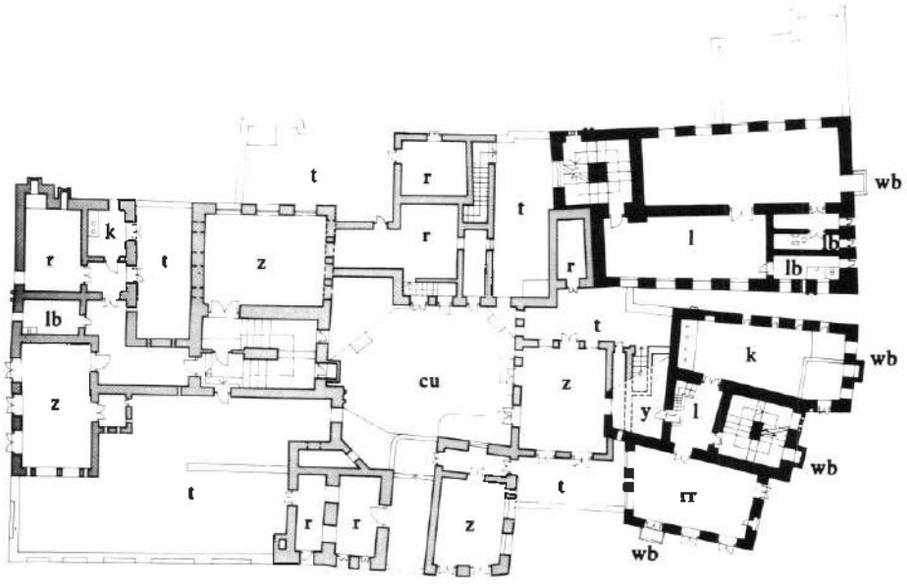
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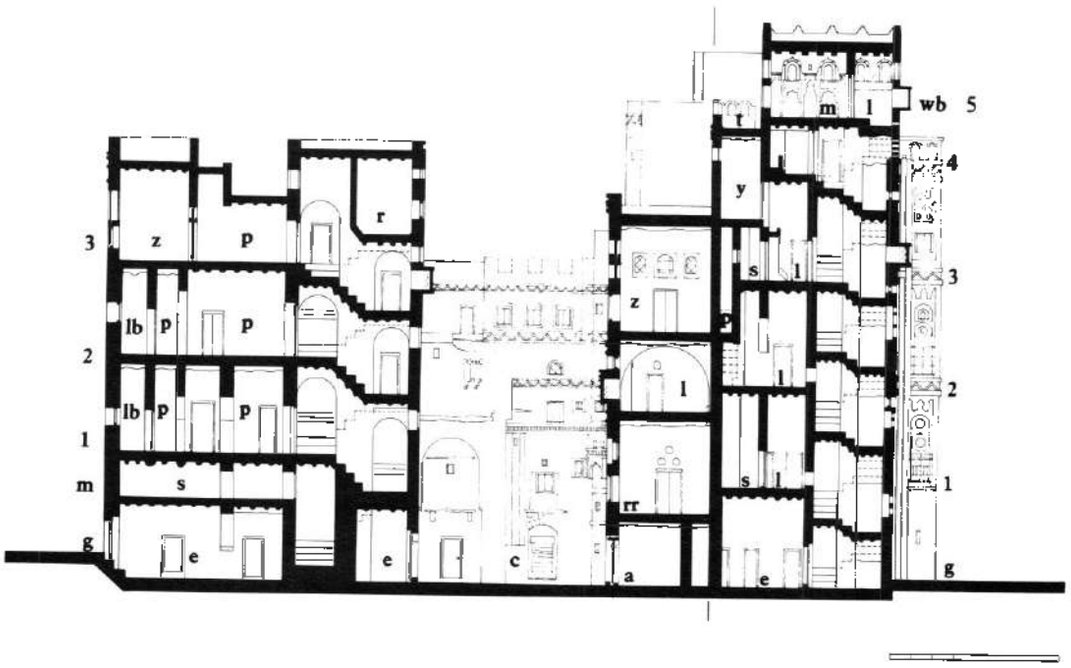
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appears to be stepping inwards throughout its height, because of the fact that each course leans outwards a vertical wall is maintained. The origin of this curious form of construction (*mushawazah*) is not known, but at least three explanations might be given, and it is possible that the three combined to produce this type of walling. These explanations are: the influence of rather similar pre-Islamic structures, of which the best examples we have to date are Axumite or pre-Axumite ones in Ethiopia; a desire to prevent cracking through settlement; the need to increase stability against earthquakes. They are further discussed below.

Axumite and pre-Axumite structures usually had a stepped lower wall, each step varying from 2 to 5cm. The number of steps was seldom more than eight, so that the upper part of the wall did not have them, whereas early Ṣan'ā' Islamic stonework is given them throughout its height. Another difference is that the Axumite walls were actually diminishing in thickness as they stepped, which the Ṣan'ā' walls do not.

Early builders may have felt that a possible defect in the stability of the Ṣan'ā' stonework lay in the tapered shape of each stone. In order to counteract any settling effect, the thickness of gypsum mortar under the back of the stone might have been slightly increased, so that if the mortar contracted on drying, or the wall bulged slightly (there are seldom stones running right through from the front face to the back face of the wall) the stones would be able to settle into a more upright position and the wall remain strong. For the same reason earthquakes[21] might be thought to have been guarded against to some extent by this kind of stonework.

Stonemasons today do not practise this stepped stone technique; some of them believe that it went out of fashion more than a century ago, and hold it in contempt as a weak method of building walls. Perhaps they are repeating the opinion of Turkish military engineers? The stonemasons no longer retain any memory of the reasons why this strange technique was once used.

The first action in building a wall is that they spread (*farashū*) *ḥishāsh aswad,* also called *karrī*—a *raṣṣah* (spreading) *min al-karrī al-ṣighār. Karrī* is also spread in muddy streets or in a court (*ḥawiyyah*) rather as a sort of road-metal. The *ju'm* is put in as a foundation, then a layer of cement (nowadays), *taṭrīz/taḍrīz,* then some three, four or more rows of *ḥajar aswad.*

Foundations project slightly on either side of the wall above, the additional thickness averaging about 20cm. They are made of rubble stonework using quarry stone, basalt boulders (*ju'm*) or wadi-bed stones. The lower courses of the wall above, up to a height of six or eight courses above ground level are built of hard black basalt quarry stone (*sawdā*), each course being 20-25cm high. The stepped foundation generally begins slightly below ground (50cm), and extends down for 60 to 80cm. It has an earth mortar, whereas the wall itself has a hard mortar of lime and earth from 50cm below ground to one and a half metres above ground level to stop salts and damp rising in the stonework.

Brickwork begins above the stonework, which, in houses, ceases at between three metres and ten metres above ground level. Brickwork, being lighter than stonework, is more suitable for upper walls; bricks are easier to carry up staircases, and more flexible in permitting large openings.

Baked bricks (*yājūr,* pronounced *yāgūr*) average 16.5cm square and 4cm thick, although there is considerable variation. Older bricks are as much as 8cm thick and up to 20cm square. They are made from local clay on the north east side of the city, a short distance beyond the walls. After being shaped in a box and dried in rows in the sun (pl. 22.120) they are stacked in one of a number of low brick kilns and burnt for two days using dung or skin and bones as fuel.

Because the bricks are normally square, it is not common for brick patterns to be created by variation in the bond; instead this is done by inserting bricks at an angle, by projecting or recessing bricks, or most commonly, by cutting a pattern into bricks laid in a normal bond (pls. 77 and 22.124). Arches over openings are usually double arches, the inner arch separated from the outer one by square bricks on edge, and the inner arch built up from half bricks, whereas the outer arch is a standard brick dimension in thickness. Voussoirs near the centre are sometimes slightly shaped into wedges to make the horizontal section of the arch stronger. This is done by rubbing the brick on the black pumice-like stone referred to above. *Mortar* for brickwork is normally clay mortar, with a little gypsum added, but this is changed to a pure gypsum mortar every five or six courses, over large openings and in areas of stress, such as the corners. On the outside face, where it is exposed to the weather, lime mortar is sometimes used for the outer joints.

Upper walls are generally two bricks thick, i.e. 36cm or more, on lower levels two and a half or three bricks in thickness. The topmost storey and parapets are sometimes only one brick in thickness, with extra reinforcements provided by piers.

Mortars have the same mixes and methods of manufacture as plasters, which are discussed below.

Unbaked brick (*libin*) is sun dried, and contains straw and chaff for greater strength. It varies in size from the common size of baked bricks up to the massive size used in farmhouses of approximately 44cm by 22cm by 11cm; even larger sizes are sometimes seen. Mouldings are usually executed in lightly-baked, small, common-sized bricks, or in fully-baked bricks.

At least two methods of building in unfired brick (*binā al-libin*) are distinguished, *binā al-sayr* when the bricks are laid with their ends to the outside, favoured for the largest brick sizes, and, secondly, *binā al-khasf* when the bricks are laid end to end with their long sides exposed.

Openings are bridged using arches of the same materials, or flat arches of small bricks resting on a row of thin timber beams. The mortar used is a clay, sand and straw mixture (*milājah*),[22] sometimes with animal dung added; it is left to 'mature' for several days, fermentation produces chemicals which give it strength.

Unbaked brick walls are frequently used on cheaper work above stone plinths or lower walls.[23] Occasionally the highest, thinnest sections of a house built mainly in unbaked brick will be executed in baked brick.

Coursed clay (*zābūr*) is used for lower walls in cheaper work in Ṣan'ā' and is standard construction in many country towns and farms. It is laid in courses 50 to 70cm high, the bottom of each course slightly overhanging the one below and then tapering gently to be thinner at the top, creating a visual separation between the courses which is frequently accentuated by weathering. A foundation of coursed rubble usually extends above ground to a height of between 30 to 90cm. Often a layer of gravel or a course of bricks is introduced on top of the stones, before the first clay layer. The clay is taken from a borrow pit near the site.[24] It is mixed with sand, straw and chaff, water is added, and then it is beaten or trodden underfoot. It is left to mature for two days, during which time chemicals from the straw and chaff mix with the clay to produce a stronger and more water-resistant mortar.

The clay mixture is passed from the ground to the workmen on the walls by shaping it into balls which can easily be thrown.

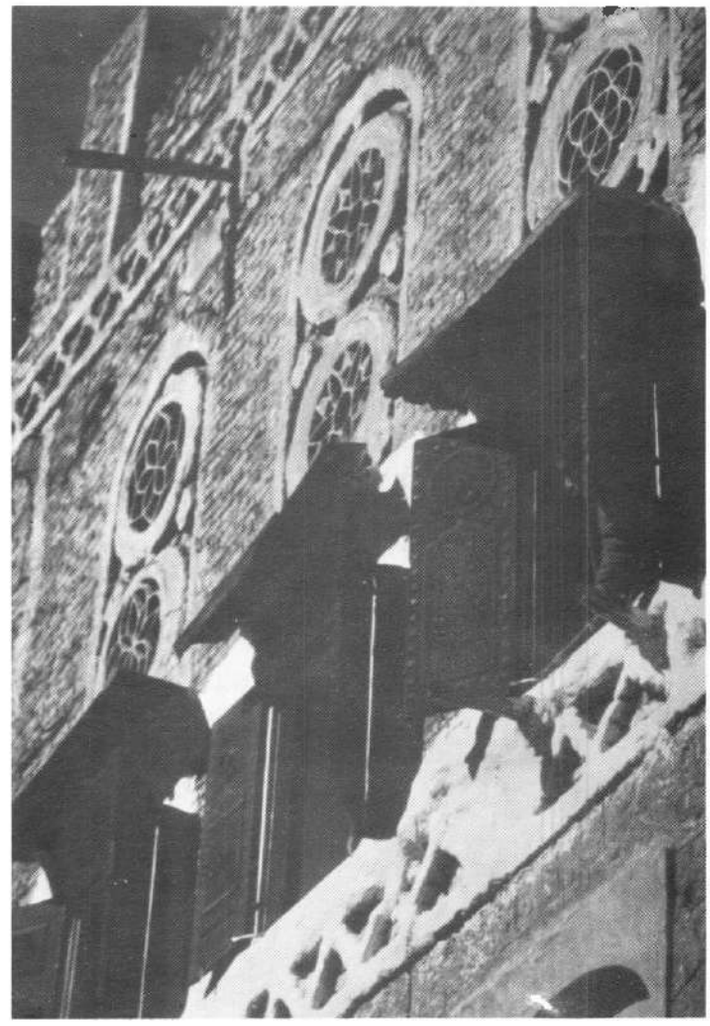
21 Earthquakes did some damage in Ṣan'ā' in, e.g., Jumādā I, 1077/1666 (*Ṭabaq al-ḥalwā,* fol. 60b.) and in 1314/1896-7 an earthquake accompanied by a red wind caused people to flee to al-Jāmi' al-Kabīr (Zabārah, *A'immah,* (2), II, 196).

22 Qāḍī Ismā'īl, op. cit., 33, no. 92, defines *milājah* as *milāṭ,* 'a coating of clay, straw and dung called *al-siyā'* with which walls and roofs of houses built of adobe are covered to protect them from being eroded by the action of the rains.' The saying is, *Ajbī Shibām kulla-hā milājah,* All the roofs of Shibām (Kawkabān) are *milājah.*'

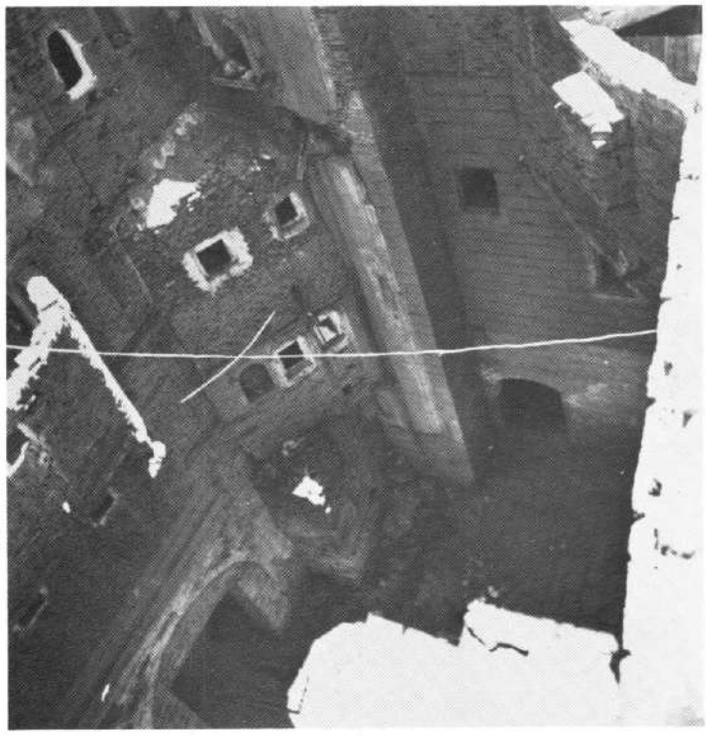
23 According to a United Nations survey undertaken in 1970, unbaked bricks of the large size cost 30 *riyāls* per cubic metre including labour, baked bricks 100 *riyāls* for the same volume with labour, and cut stonework 140 *riyāls.*

24 Clay pits are studded throughout the city, both inside and outside the walls. The material for the city walls likewise came from some of these pits.

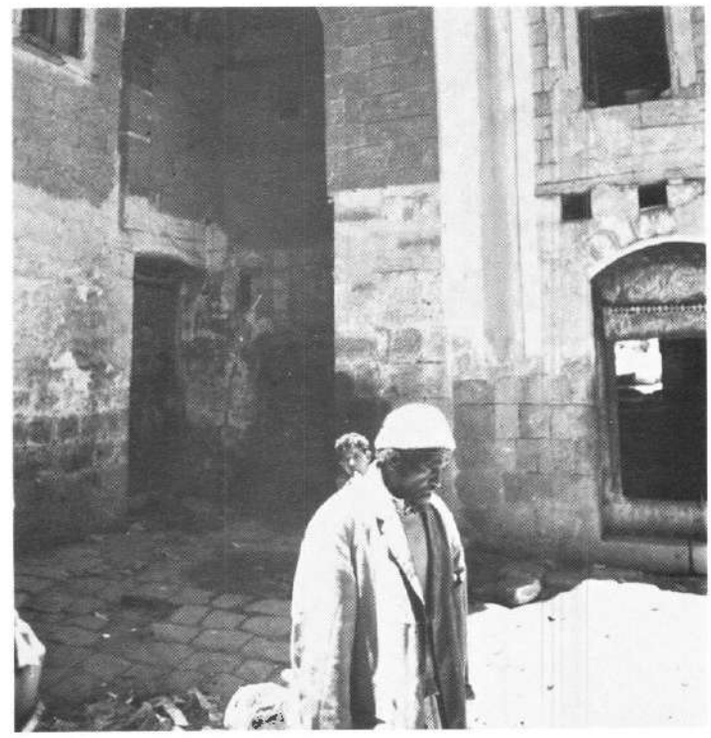
22.79 House F. The exterior.



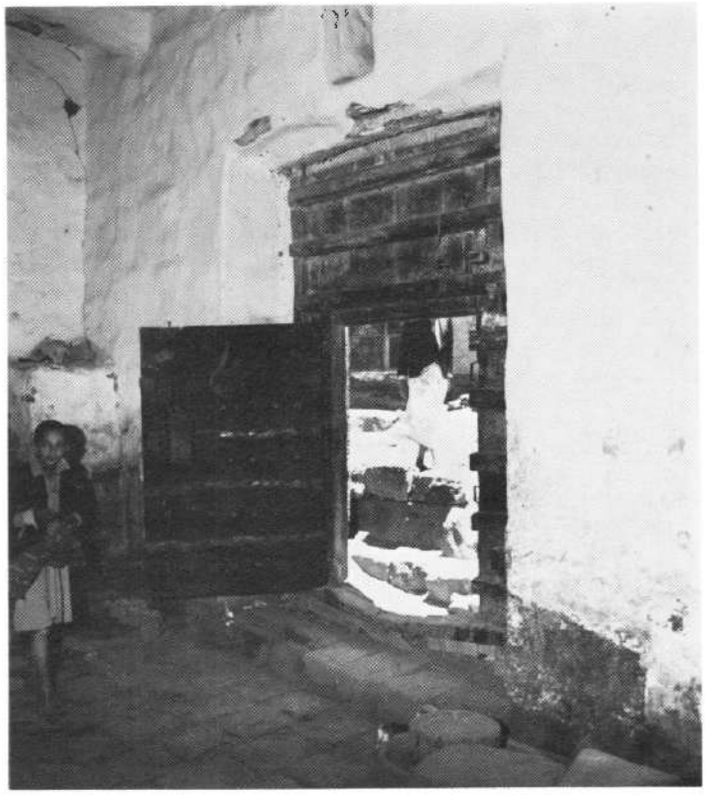
22.81 House F. Detail of the external facade showing the windows and their shutters.



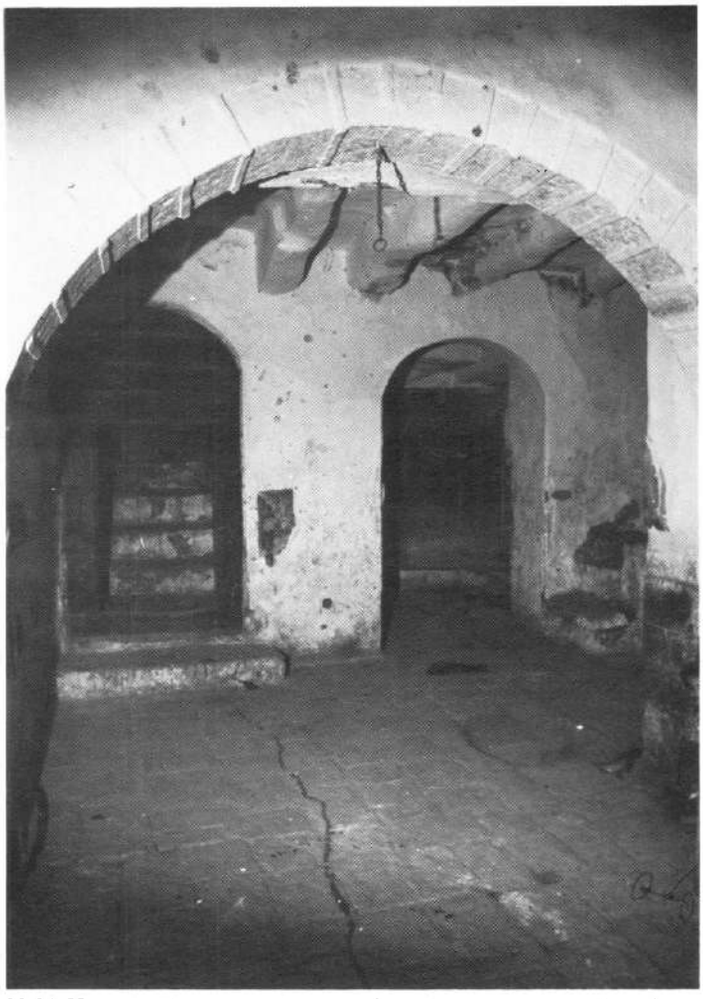
22.80 House F. Looking down into the courtyard at one side.



22.82 House F. The courtyard.

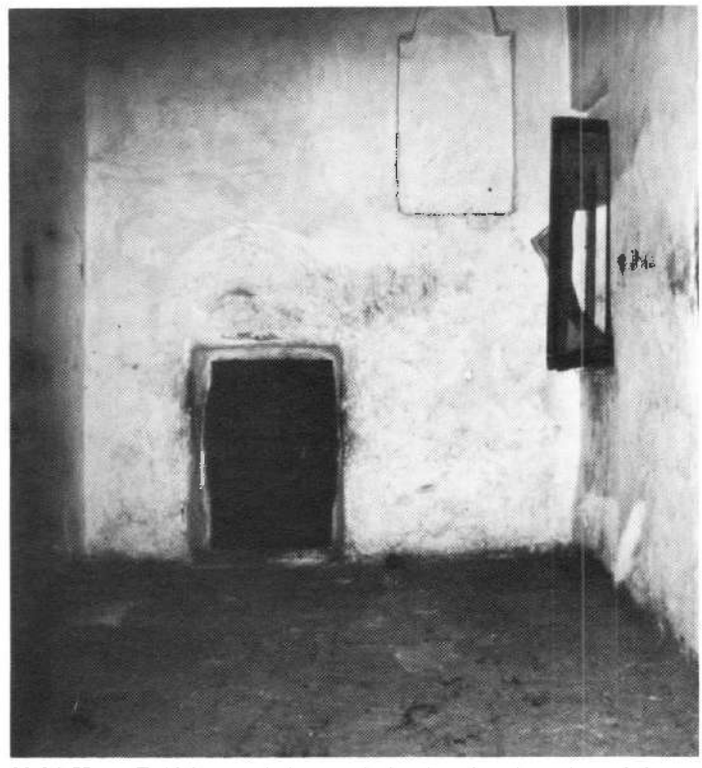


22.83 House F. The entrance hall.



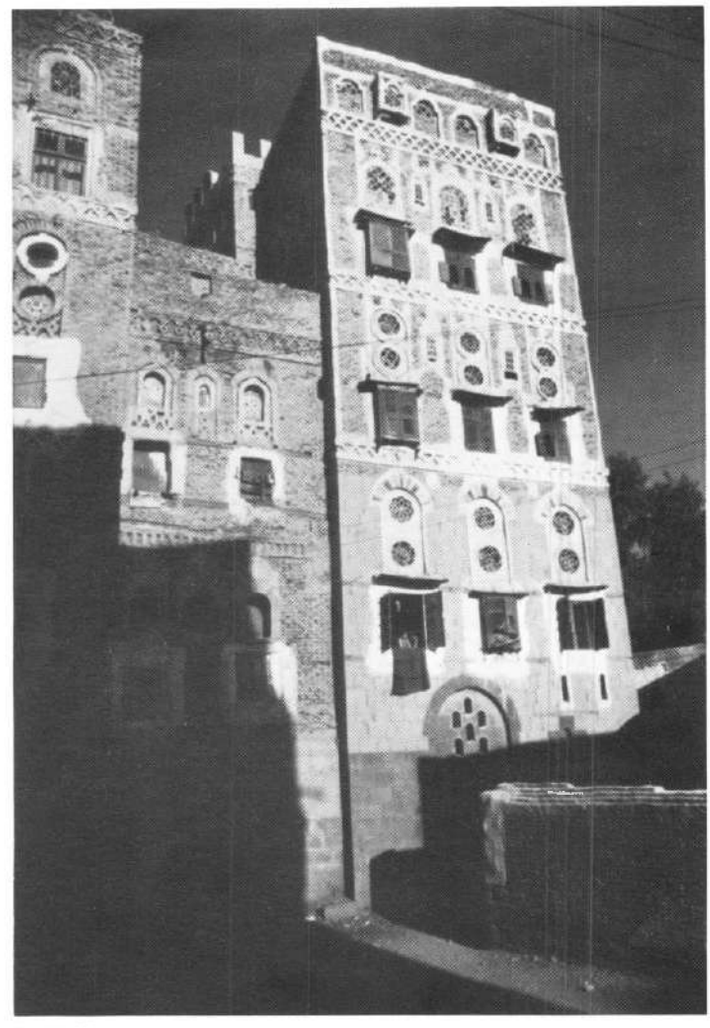
22.84 House F. The entrance hall, seen from the entrance doors, the staircase door straight ahead, and, to the right, the door into the courtyard.

22.85 House F. The staircase, showing the alabaster panelling.



22.86 House F. Alabaster windows on the landing of a staircase in an old house in Ṣan'ā'.

22.87 House F. A typical *manẓar*.



22.88 House A. The entrance facade.

The builder catches them and lets them drop into position on the wall, then pummels them into shape so that they make a homogeneous mass 40 to 50cm wide. There is no shuttering.

Each course is completed and left to dry for from two days to a fortnight before the next course is begun. Openings are bridged with stone slabs, or with rough timber reinforcing built into the thickness of the clay courses.

Wooden bands (*furshah*, pl., *furushāt*) run around many of the houses, especially those with lower storeys built in stone or brick. They appear to be carefully joined so that they form a continuous girdle holding the walls from bulging outwards; they would naturally also take up stresses due to unequal settlement or earthquake shocks; a further advantage in their use is that they allow sections of the stone wall below them to be renewed with less danger of the wall above them cracking. There are usually two of these bands above and below the lowest large windows, acting as sill and head, and sometimes another running through the stonework below. They are often whitewashed for weather protection and therefore not immediately recognisable as wood. Although other woods are used, a favourite for this purpose is apricot wood, which becomes stronger when it is damp and resists decay.

Plaster (*quṣṣ*, *jaṣṣ*, pron. *guṣṣ*, *gaṣṣ*) *and plastering* (*taqṣīṣ*). The bulk of all plasters used in Ṣan'ā' are derived from gypsum, the essential burnt gypsum ingredient also being popularly known as *quṣṣ*;[25] lime plaster is relatively little used, as lime (*nūrah*) is expensive, and is reserved for conditions requiring a good deal of waterproofing or protection from the weather.

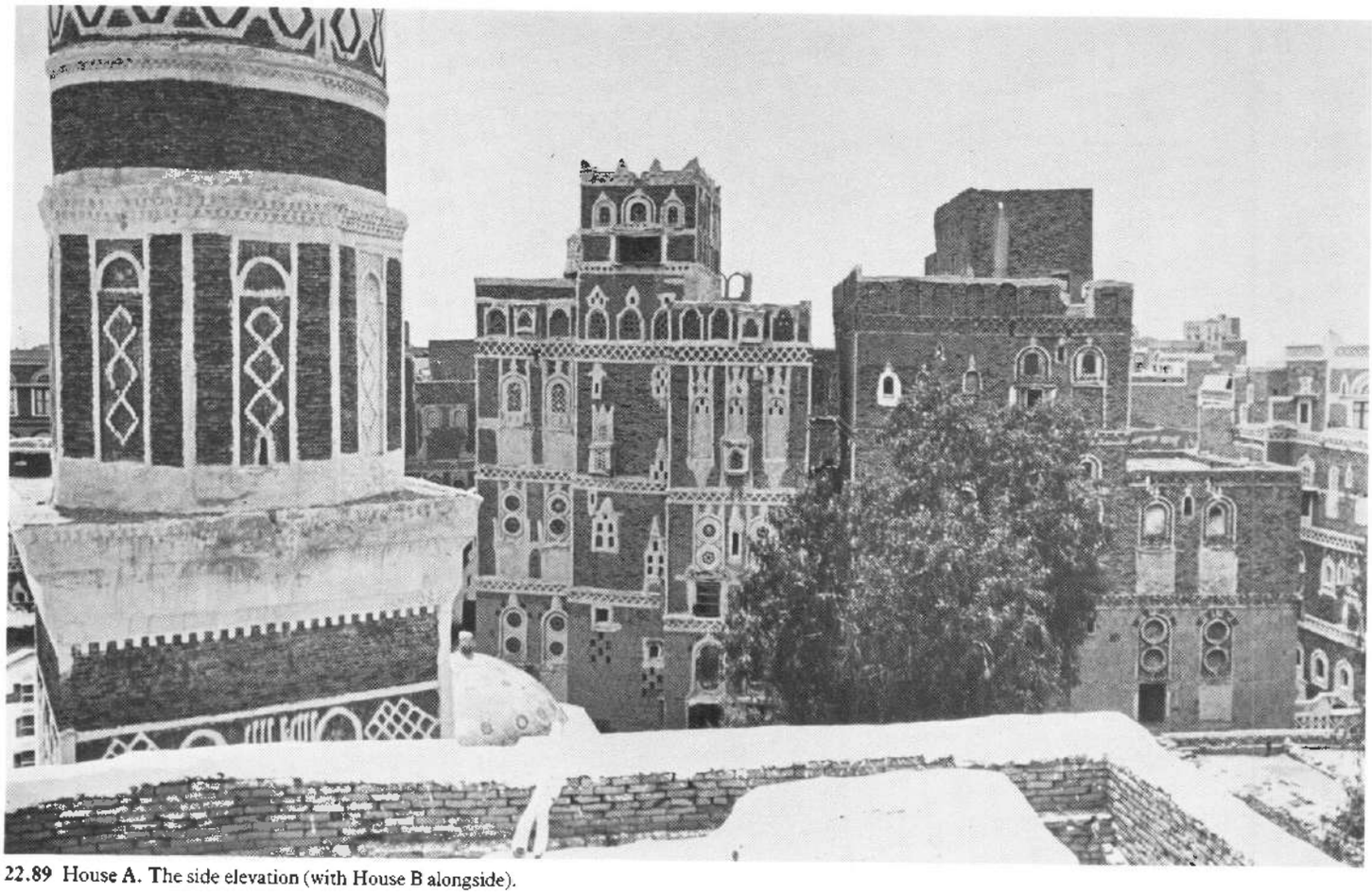
Al-Ḥājj Muḥammad 'Alī Nāṣir al-Maqwalī, a shaykh or *usṭā* of the Ṣan'ā' plasterers living in Ḥārat al-Ṭawāshī was brought to us by 'Alī Ḥizām al-Ṣabāḥī who helped interpret the difficult terms he used.

The best *quṣṣ*, he said, comes from al-Maqṭa' al-Dākhilī, i.e. Minṭaqat Banī Jarmūz, from Bayt Ḍahrah. The Dākhilī and Khārijī of the Banī Jarmūz are two villages separated by a big mountain, but the Bayt Ḍahrah are one family (*usrah*). How ancient this is may be judged from al-Hamdānī's remark on Shibām al-Ghirās below Dhū Marmar (Alabaster) Mountain, 'From Shibām *quṣṣah* is conveyed to Ṣan'ā', there being less than half a day between them'.[26] Jabal Ḍabāb/Ẓabāb which figures on von Wissmann's map, provides the stone from which the *quṣṣ* is made by burning for three days (*muṣāfat thalāthah ayyām*),[27] all of it gives ore (as it were) of *quṣṣ* (*kull-ih yiddī ma'dan quṣṣ*). ('When you have extracted *quṣṣ* stone,' said al-Ḥājj, 'the *quṣṣ* grows in its place again, or it can grow itself without earth on it [in the mountain]'). The *quṣṣ ḥaqq al-Dākhilī* is pure (*ṣāfī*), and clear white (*abyaḍ fātiḥ*).

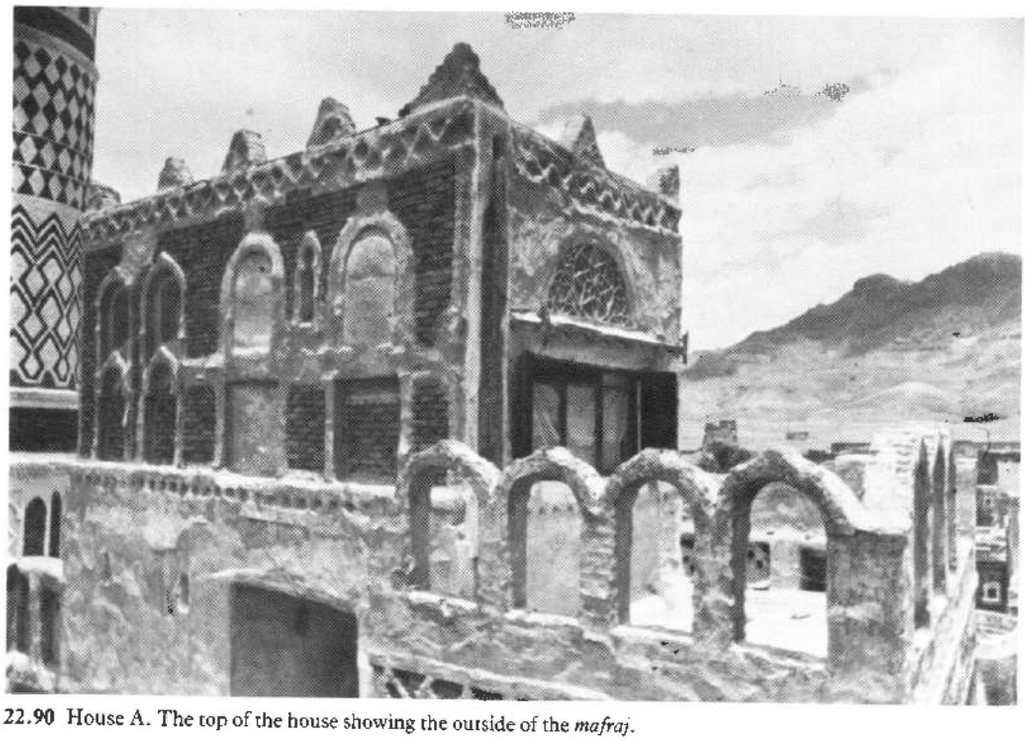
25 The source gypsum stone (basically the same material as alabaster) is quarried at Ḥarrah. It is burned in the same way as limestone, but the temperatures needed to convert the lumps of stone to hemihydrate ('Plaster of Paris') are much lower; as this necessitates less fuel, gypsum plaster is likely to have been much more commonly used than lime plaster in antiquity. 'The best stone for *quṣṣ* is red (*aḥmar*) gypsum, whereas *qamarī* is white (*abyaḍ*) gypsum; the former comes from al-Ghirās.' (Usṭā Sirḥān al-Rawḍī.)

26 *Iklīl VIII*, 104. *Nashr al-'arf*, II, 900, says Banī Jarmūz is the most remote of the Banī 'l-Ḥarith villages, some hours north of Ṣan'ā'.

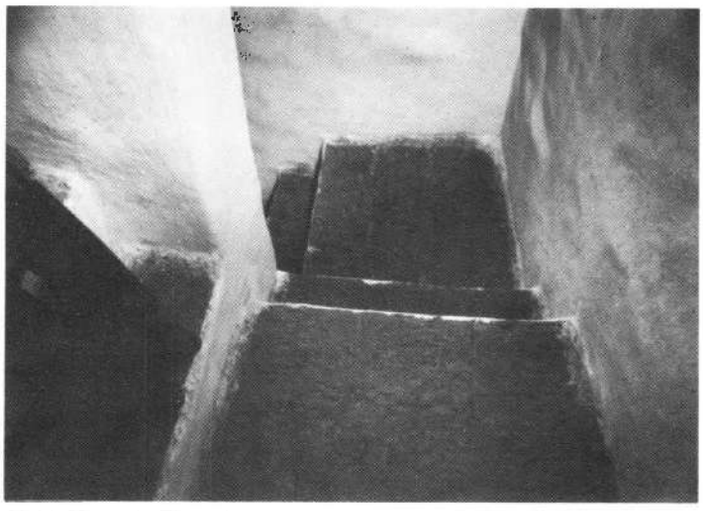
27 'The more slowly it is burned the better the *quṣṣ*; if wood is used instead of oil for burning, the *quṣṣ* is better because it takes more time.' Usṭā Sirḥān al-Rawḍī—see n.30 below. A poem of Tha'labah b. Su'ayr, said to belong to 'Udhrah of reputedly Yemen stock, a pagan but said to have become a Muslim has a reference in a verse to *Fadanu 'bni Ḥayyata shāda-hu bi-'l-ājuri*, the castle of Ibn Ḥayyah which he built with burned brick and *shid*, which means *jiṣṣ*/gypsum. (C. J. Lyall, *al-Mufaḍḍaliyyāt*, Oxford, 1921, 256-7, trans., Oxford, 1918, 87).



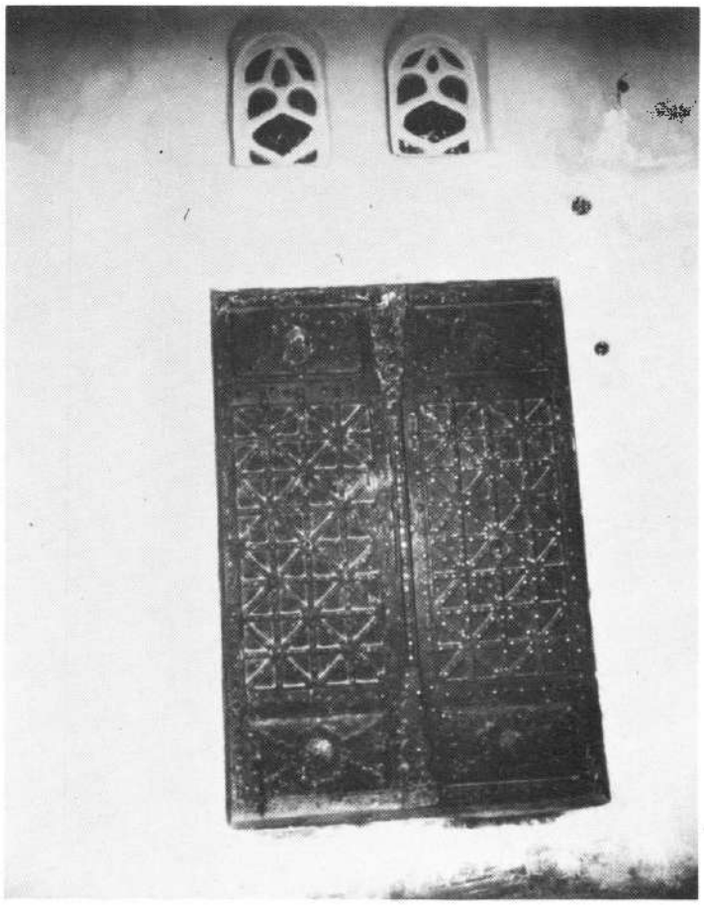
22.89 House A. The side elevation (with House B alongside).



22.90 House A. The top of the house showing the outside of the *mafraj*.

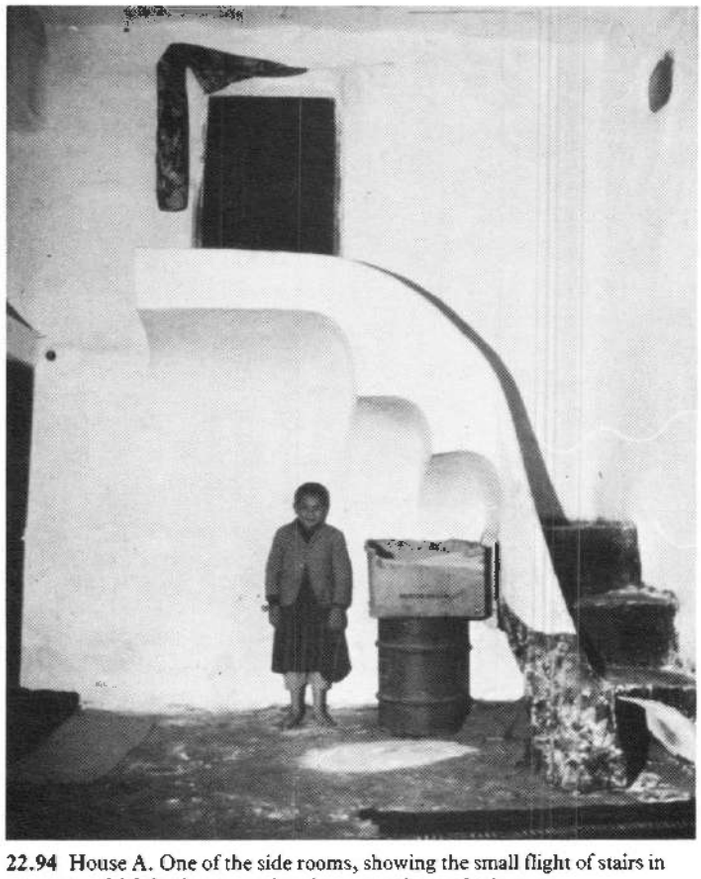


22.91 House A. The staircase.



22.92 House A. The doors to the *dīwān*.

22.93 House A. The wall of the *dīwān*.

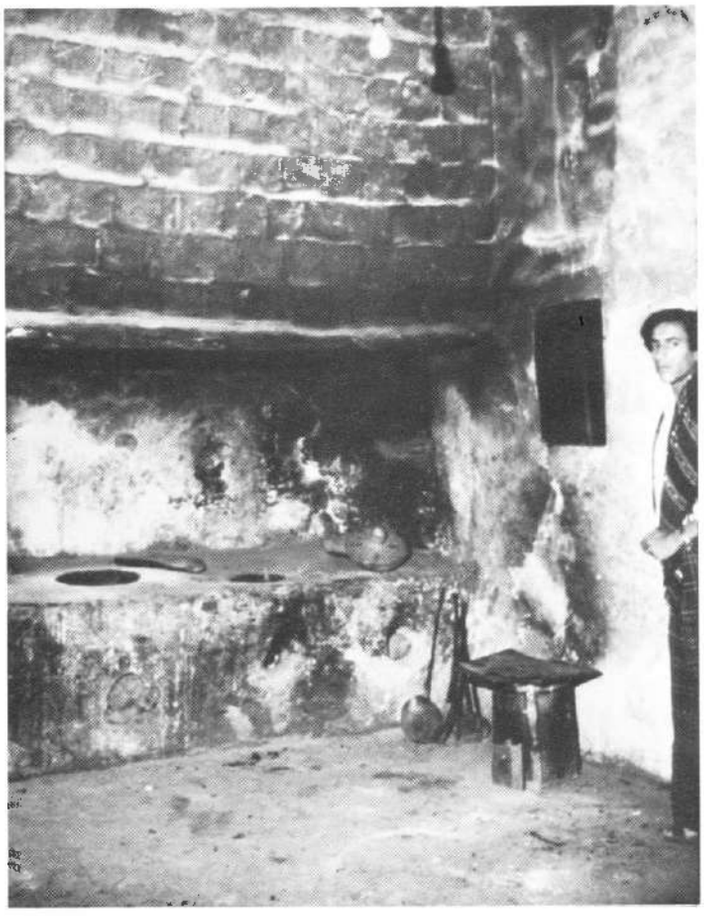


22.94 House A. One of the side rooms, showing the small flight of stairs in gypsum, which leads up to a dressing room above a bathroom.

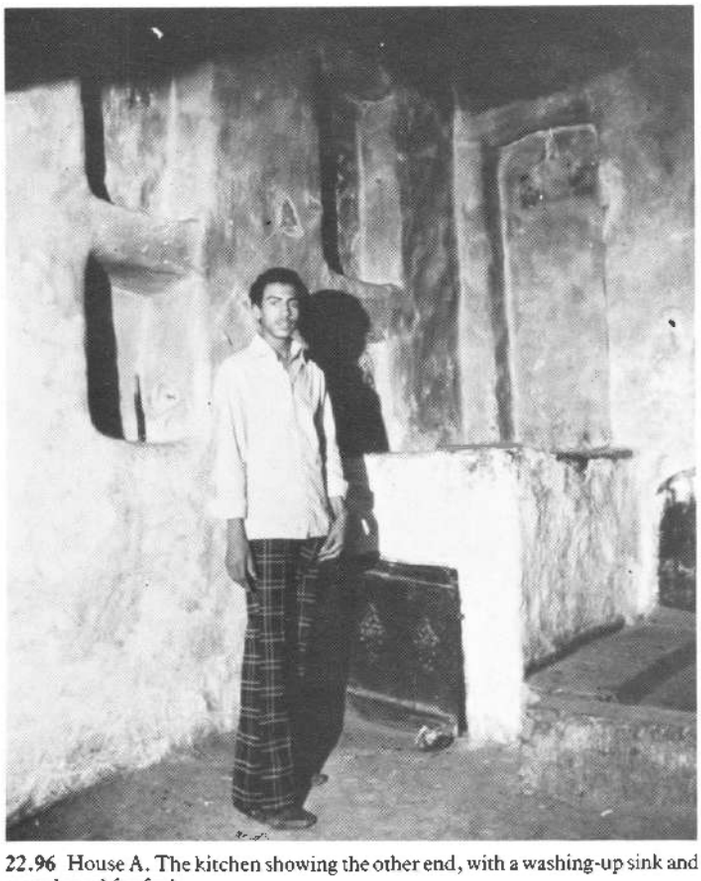
The Khārijī *quṣṣ* of Banī Jarmūz is a new kind, coarse, composed of *quṣṣ* with half grit (*nays*)—it is in fact like *nays* and red (*muḥammir*) in colour. It was stated to be used for the first coating applied to walls, mixed with red grit (*awwal qirshah min al-quṣṣ tulabbas 'alā judrān yukhlaṭ 'ala 'l-nays al-aḥmar*).

The *quṣṣ* is pounded in a mortar, a hollowed out stone (*yiddū(h) mawḥiz, ḥajar manqūrah/maḥfūrah*) with a piece of wood (*khashabah*) with two arms (*masnadayn* = *sā'idayn*). This is women's work (*amal al-niswān/ḥarīm/nisā*). The action of working plaster is known as *khayshah*. They work (*yashtaghilū*) the *quṣṣ* mixture before it 'dies' (*qabl mā timūt al-khalṭah*). *Quṣṣ min al-Dākhilī* is allowed to cool for two weeks (*yibrid usbū'ayn*) before being used for the operation known as *ghasīl* or washing down.

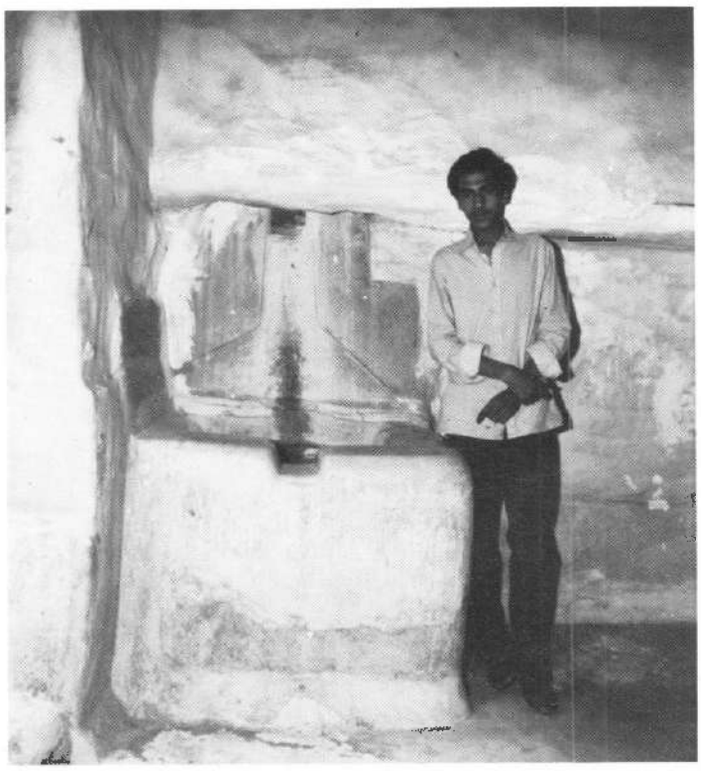
The various grades of plaster work are *masḥah bi-'l-mālij*



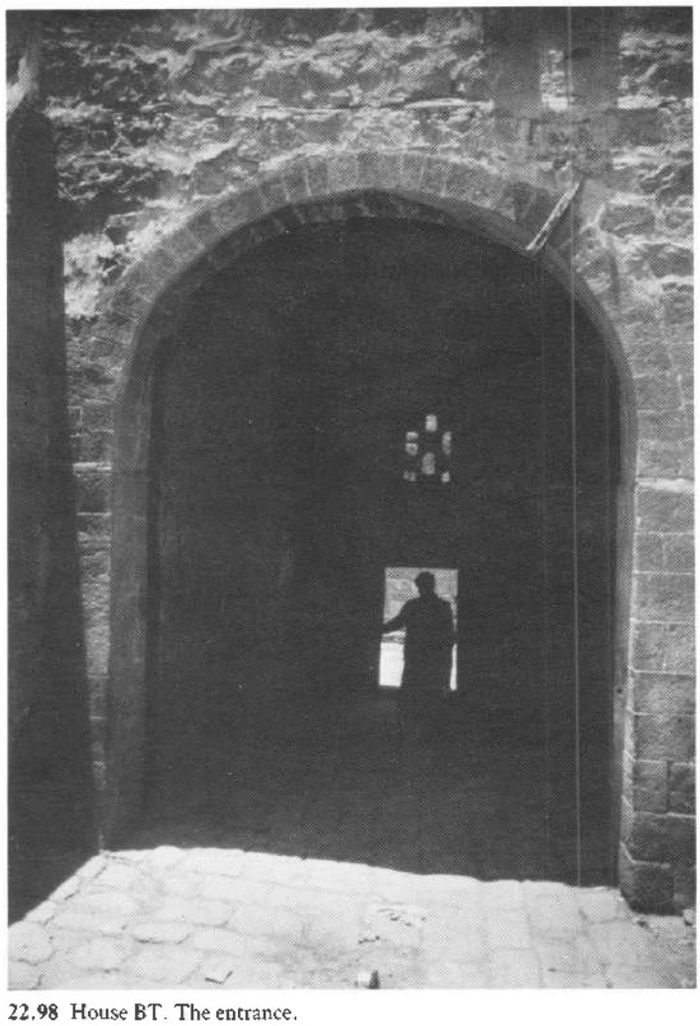
22.95 House A. The kitchen showing the cooking range.



22.96 House A. The kitchen showing the other end, with a washing-up sink and a cupboard for fuel.



22.97 House A. The open air laundry on the roof.



22.98 House BT. The entrance.

application with a *mālij* which is an iron (*ḥadīdah 'alā wuṭlah*), i.e. with a plumbline (*mīzān khayṭ li-tumlij*) so that you can apply the plaster.[28] *Masḥah khām* is second class work, it is application with the iron (*masḥ bi-'l-mālij*) judged only by eye. *Marshah* is operation by hand (*'amaliyyah bi-'l-yad*) which is considered poor work (*'amal ḍa'īf*) and is the lowest in cost. Washing down is executed with *quṣṣ* using a leather or sheep's wool (*al-ghasīl bi-'l-mikhlabah min jild aw al-sha'r ḥaqq al-ghanam*).

The two grades of plaster are *quṣṣ* mixed with grit and the decorative grade composed of *quṣṣ* mixed with ground alabaster to produce a marble-like surface. The latter is used for internal decorative plaster-work, for making plaster shelves and small flights of stairs to upper storerooms (see p. 455b) as well as for constructing pierced tracery windows. Shelves (*ṣufwaf*, pl., *ṣafīf*) may be ordinary without ornament (*'ādī bi-dūn kharshah = naqshah*, i.e., plain (*khām*)), or shelves may be ornamented (*makhrūshāt*). They may be simple (*muṭalqāt*), with decorated supports (*arjīl makhrūshah*) and their base (*qā'idah*) having the shape of a bird. A top shelf (*jabīn* = brow), a top shelf with a row of ornamental arches below it is *kharashāt al-jabīn mathniyah li-'l-'uqūd*. As a rule there is a shelf above doors and an *'aqd* with a *kharshah kāmilah* full decoration around it inside the room (*fi dākhil al-ghurfah*) and a line (*maṣṭarah*) on the outside of the room (*min al-khārij li-'l-ghurfah*). Various types of ornament are *muqhammaqāt*, ornamented like women's veils, *mutafarnajāt*, Frankish type, with almond shapes (*lawzah*, pl., *lawazāt*), *al-mawzah*, banana, *al-rās*, head, *anṣāf* halves, *khātam mathmūn* eight-sided seal, *zinjīrī* chain, *jarā'id muthallathah* triangular strips (?), *zahrah mathmūnah* eight petalled flower, *dāyirī*, a row of circles, etc.

When a masonry wall is built of stone which is uneven at the edges (as probably in the case of *rub' waqīs*, p. 468a), the space between the blocks of stone is filled with *quṣṣ*-plaster, this filling being made to project a little to the front beyond the stone for strength and decoration—the process is called *takḥīlah*, the putting of kohl around the eyes as eye-shadow, and one would say *''ankaḥḥil-hā*, we'll give it a dressing of plaster.'

A kind of wall is composed of a brick face and *juṣṣ* poured between it and *libn* clay to make it stick—called *ṣabb al-juṣṣ*.

When the window with its frame is set in the wall, an application of plaster (*ṣabb quṣṣ li-'l-'asīl*) is made to the spaces between the edge of the frame and the wall, *ṣabb* literally meaning 'a pouring'.

Lime (*jīr*/*nūrah*) made of burned limestone or chalk[29] is mixed with grit and, in the best work, the burnt brick of the exterior of houses is protected with a coating of this lime plaster. Unburned brick may be protected with the same material or with the clay coating (*milājah*).

The *milājah* applied to clay walls differs little in composition from the clay bats used for adobe walls, except that the proportion of clay is reduced in favour of more grit and chaff. Cheaper burned brickwork is often protected externally with this clay coating, and it is also a common finishing material for the outside of houses in smaller towns and on farms. It is not usual to paint the clay coating which retains a good appearance, except possibly around important windows which are whitened with lime to give them a frame. Sometimes the clay coating is entirely repainted with a wash made from animal dung which hardens the surface and gives it a good appearance.

There are two special plasters for permanent, weather-resistant, high quality finishes, *khudr* and *qaḍāḍ*; the former is the cheaper and less durable of the two.[30]

Khudr is a general waterproof plaster, floor or roof finish, or mortar. It is used for jointing the stones in the floors of bathrooms and lavatories in houses and elsewhere, also for the stone pavings of mosques and public buildings. It is made by crushing together, dry, with a black stone, lime (*nūrah*) and ashes (*ramād*). The lime varies in strength depending on its origin: Ḥaddah lime is strongest, and needs only two containers (*tanak*) to five containers of ashes, whereas three containers would be needed of Ḥabābah lime for the same quantity of ashes; the latter come from the public baths, i.e. they are ashes from burnt human faeces.

The *khudr* is mixed with water and kept for one or two weeks, during which time it ferments. It is then made into a heap, which is kept turned over every fortnight, while it is being drawn upon for use. The mixture remains good for any period from two weeks to three or four months.

Qaḍāḍ is used for both waterproof dadoes and other surfaces on walls, for lining important water cisterns, drains and for roofs on mosques and other important and expensive buildings. The manufacture of *qaḍāḍ* is an extremely skilled and prolonged operation. Grit is taken from stones called *ḥishāsh*, which can be ground very fine; three measures of it are mixed with two of the lime (*nūrah*); it does not matter whether the lime is slaked or not. If the lime is very good, five measures of the *ḥishāsh* are used. Water is added, and the mixture is crushed together by pounding with a black stone; then it is left to ferment for a week. This is done by a trained worker (*'āmil*) under the direction of the *usṭā*.

When the mature mixture is ready, the walls are washed very thoroughly with a brush, then a layer of the mixture is applied, being beaten into place with a black stone throughout the whole of a morning until noon, when it is made smooth. When work starts again in the afternoon it is beaten again until nightfall. It is described as very laborious work.

Patterns are introduced at the end of the first day, using the black stone, and following patterns which were made on a drawing on the preceding day, by the *usṭā*. After each beating on the following days the patterns are made again.

On the second day the same procedure is followed again, but for a little less time. On the third day, by which time it is beginning to dry, the same practice is repeated. Usually it is dry after the third day, after which the second layer can be applied and treated in the same way for a day and a half.

After waiting a day until the second layer is dry, a wash of plain lime is applied, and this is polished with a piece of pumice. The next day the application of lime wash with a brush, and its polishing with pumice is repeated. It is then left for a week and the same process is repeated with a more watery mixture of the lime (1:1).

After it is finally dry, a brush with very smooth hairs is used to brush down the surface while throwing on water; this will make the surface go cream in colour. This is very slowly executed, and a good *usṭā* will do only 1 metre by 6 metres in one day. After one or two weeks the process is done again.

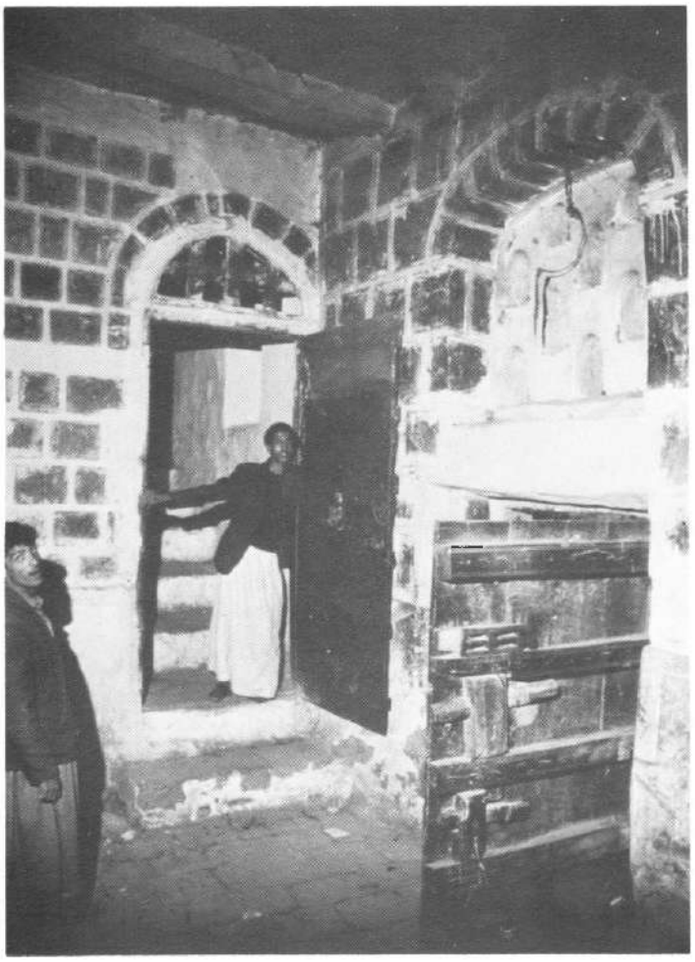
(Some workmen speed up this stage by putting a thin layer of pure lime on top of the *qaḍāḍ*; the resulting surface is much less resistant to the weather, and salts will attack it).

In the last stage, *mukhkh baqar* is needed. (This is the marrow

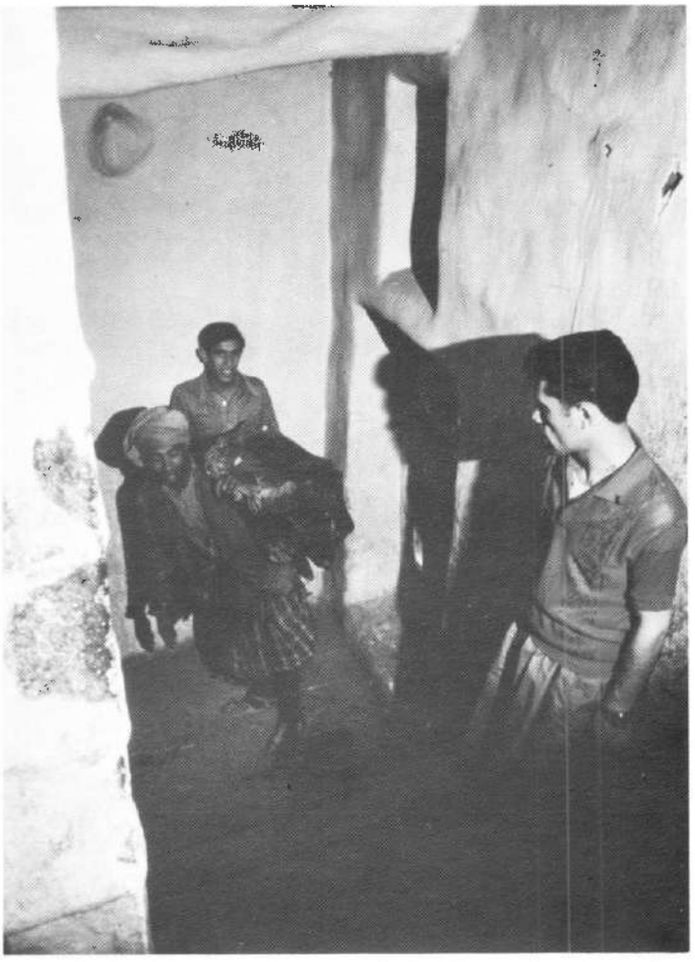
28 The 'builder's cord' is defined by *Iklīl VIII*, 8.

29 The source limestone is quarried from huge caverns north east of Ṣan'ā', near the village of al-Ghirās. (cf. Nazīh, *Riḥlah*, I, 133, II, 14 (± 1928). The village contains some forty kilns, where the stone is broken into fist-sized pieces, which are stacked above the fired kilns for burning.

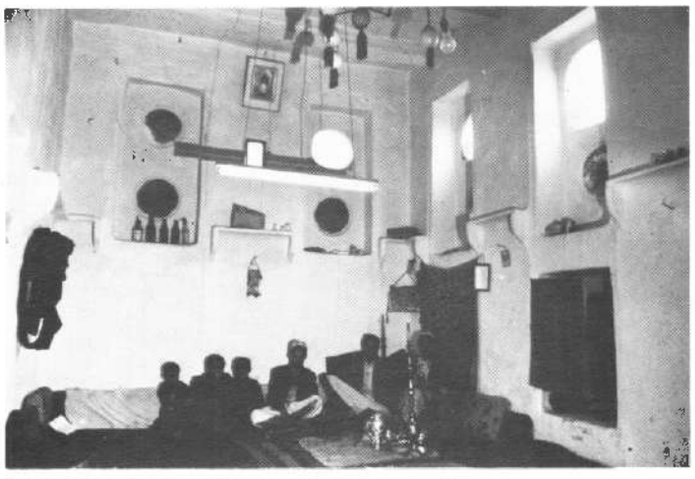
30 This information came from Usṭā Sirḥān al-Rawḍī, who was very proud of having had his training from Usṭā Ḥusayn al-Rawḍī. Such craftsmen specialize in three fields: working in *qaḍāḍ*, *khudrah*, and floor paving.
Originally, two generations ago, the Usṭā was 'Alī al-Rawḍī, who trained Ḥusayn, who then trained our informant; he himself has 5 or 6 pupils at a time, 3 inexperienced pupils to mix, 2 experienced to help the *usṭā* put the mixture on the wall. He starts to train them at any age, from 10 upwards, and they stay with him for any period they wish—it would be possible to train them in one year. The pupil, once he is independent, calls himself a worker (*'āmil*). After he has been doing *qaḍāḍ* for about ten years he has earned the name Usṭā. (Cf. *Qānūn Ṣan'ā'*, sections 35 and 48, vi. We are grateful to Père Etienne Renaud, who arranged and recorded this interview.) It should be noted that the tribes consider the builder, *al-bannā'*, to be a *mihnah sharīfah*, and honourable craftsman in work which does not demean.



22.99 House BT. The entrance hall.



22.101 Delivering water up the staircase of a Ṣan'ā' house which does not have its own well.



22.100 A typical use of a room for living in a Ṣan'ā' house.

22.102 House BT. The *dīwān*.

obtained by breaking open the bones of cows and scraping it from inside them.) This is put on the *qaḍāḍ* with a cloth or by hand. The wall absorbs it. (The tools for all this work consist only of very fine black stone and an iron spoon.)

Where the work has to be especially good and durable it is a practice to put a single layer of *qaḍāḍ* on the surface of the stone wall, and then break it away completely to obtain a good ground on the wall for the final *qaḍāḍ*.

In roofs, the *qaḍāḍ* is laid on top of a surface of small stones which have been put on top of the earth layer of the ceiling construction. It dries quickly because of the sun. A second layer is usually applied, but not a third layer as would be the case in the best walls.

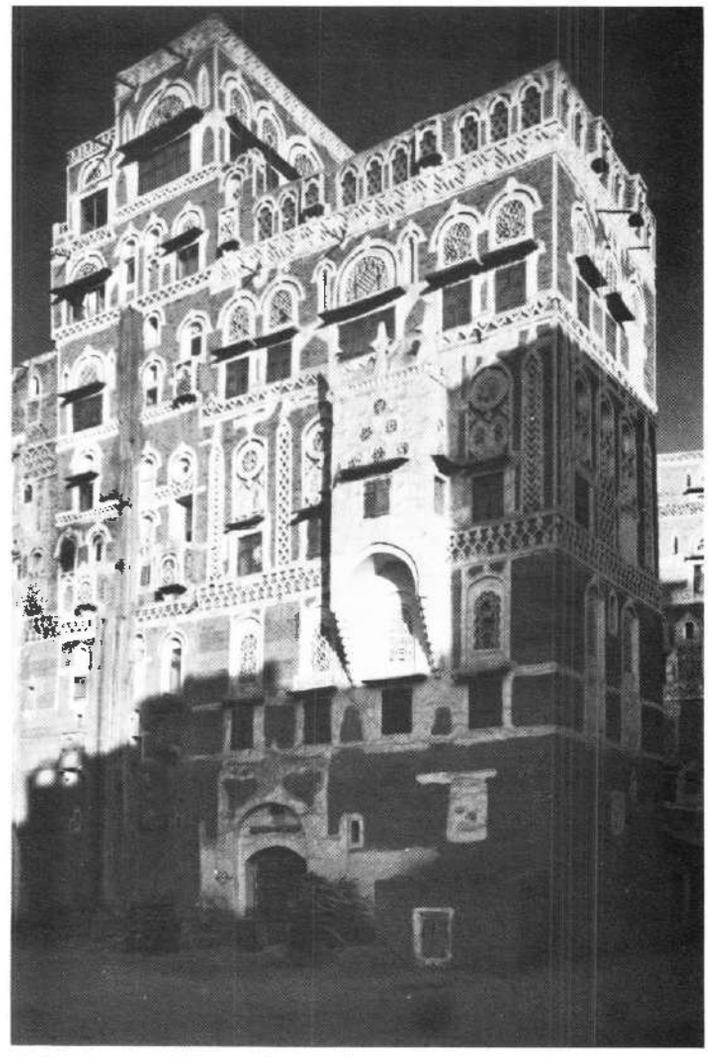
Every year *qaḍāḍ* gets stronger and darker. It has to be repaired with more *qaḍāḍ*, and cement cannot be used, as it would be turned black by the *qaḍāḍ*.

In a poem complaining of the neglect of mosques and the misappropriation of *waqf* revenues that should be devoted to this purpose, Qāḍī al-Jamālī 'Alī b. Ṣāliḥ says,[31]

Do not leave our *awqāf* to the Inspector (Nāẓir)
To spend on carpeting for the belvederes (*manāẓir*)
Whose house has come, through *qaḍāḍ(i)*

31 *Masājid*, 3, seq.

22.103 A characteristic *mafraj* in a Ṣan'ā', shown in use ca. 1936 (photo: Scott, copyright British Museum, Natural History).



22.104 House M. The exterior from the west, showing the projecting bay which holds the *dīwān* throne.

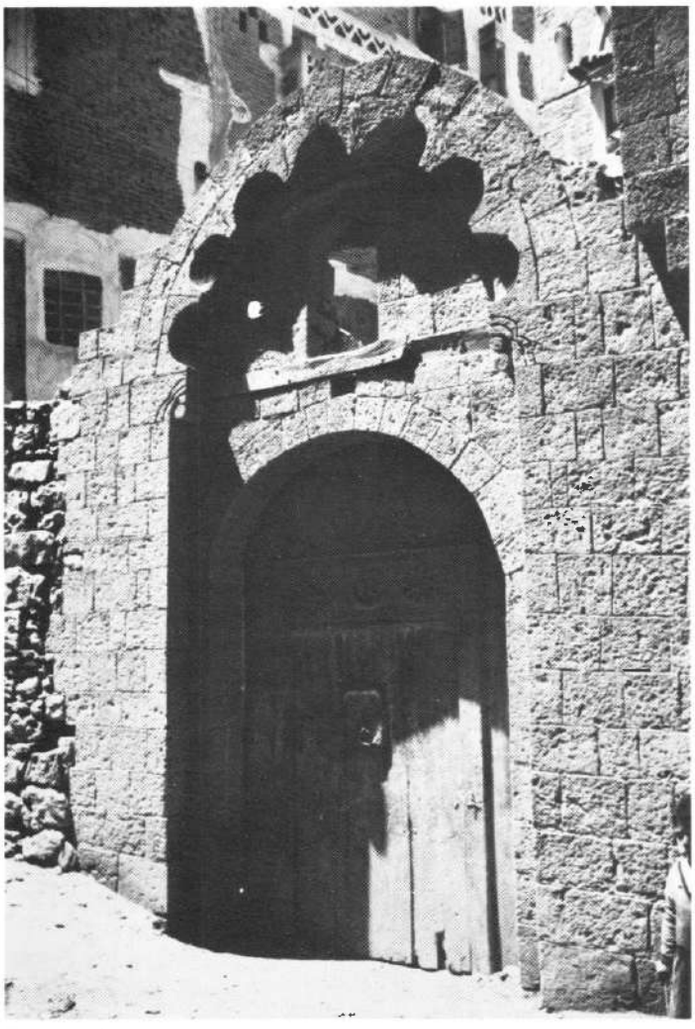
Into fine trim, in spite of any *qāḍī*.[32]
He has cemented (*qaḍḍaḍ*) the hall-passage (*dihlīz*) and stairs (*dirāj*),
Added much decoration and picked-out plaster ornament (*filāj*),[33]
Till it has become a marvel to be seen (*li-'l-nāẓir*)
Resembling the shining stars.

Internally, the wall panel or skirting has lucerne and burnt dung-cake ash (*al-qaḍb wa-'l-kibā al-muḥarraq*) also called *al-khuḍr* or *ranj* applied on top of the *quṣṣ* of the wall (not mixed with it)—this is because it keeps the warmth (*yaḥtafiẓ bi-'l-ḥarārah*) being *mu'tadilah* (temperate). They have a mortar (*madaqq*) and take lucerne and charcoal (*sawd*) or nowadays *ḥajar al-bāṭrī* (old car batteries ?) and pound the mixture and apply it to the floor of the rooms (*yifḥaṣaw qā'ah al-amākin*). The *qaḍb*-lucerne of the mixture is used to apply it like a brush.

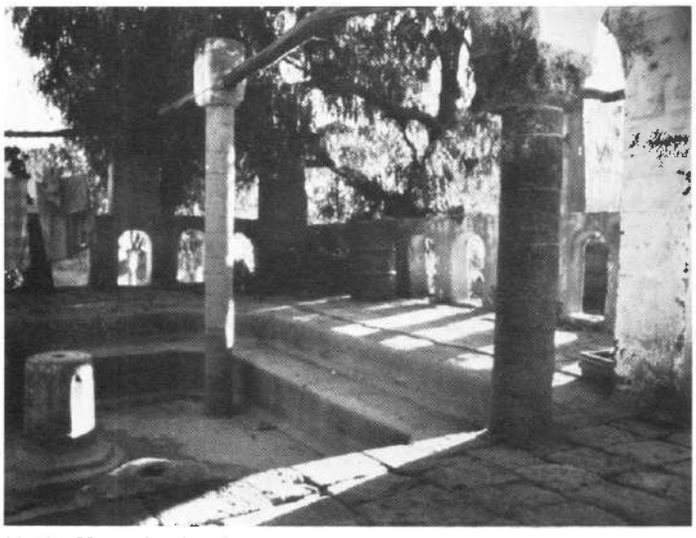
Upper floors are made by laying heavy tree trunks and branches stripped of their bark as beams across the space between the walls—these beams are spaced about 60cm to one metre apart, the space being known as *al-rabṭ*. Then thick bundles of small sticks (*al-aṣābi' ḥaqq al-bayt*) are placed spanning between these above them (pl. 22.123), finishing with a fine layer of clay and plaster covered with stone slabs for the floor surface. The sticks are of tamarisk (*athl*) usually brought from al-Shu'ūb, al-Sirr, Ghaymān, 'Amid and other places, but sticks for this purpose are now sometimes brought by truck from the lower regions of the Hodeidah road where the price is cheaper. In 1972 these latter cost one and a quarter *riyāls* an ordinary bundle (*ḥizmah*) and two *riyāls* for a large one. Gypsum (*quṣṣ*) mortar is used for joining the stones of the ordinary floors. The covering of the roof with stone slabs or, sometimes nowadays with tiles, is known as *bulāṭah*. To the ceilings (*fi baṭn al-saqf*) is applied the clay and straw paste called *milājah*. The soffit is then plastered with gypsum plaster and white-washed, this operation being known as *bulāṭat al-saqf*. A decoration of circles is often made in the plaster of the ceiling, called *ma'āshir* (literally 'trays' but explained as *dā'irah*, circle) and in the corners (*fi 'l-zuwaw/zawāwi*, pl., of *zāwiyah*) half circles (*nuṣṣ dā'irah*), in accordance with the extent of the ceiling, are drawn out with compasses (*bīkār/firjāl*).

Roofs (*jubā*, pl., *ajbī/ajbiyah*) have the same construction as floors, but the finish is hard lime plaster for waterproofing purposes, instead of stone. Alternatively it can be a mixture of grit and lime which is rolled over with a heavy stone after each rain. The waterproofing material may be obtained from an old house which is being demolished. In houses built of adobe a specially good type of clay used to keep out water is *turāb Shu'ūbī* which is strong (*matīn*).

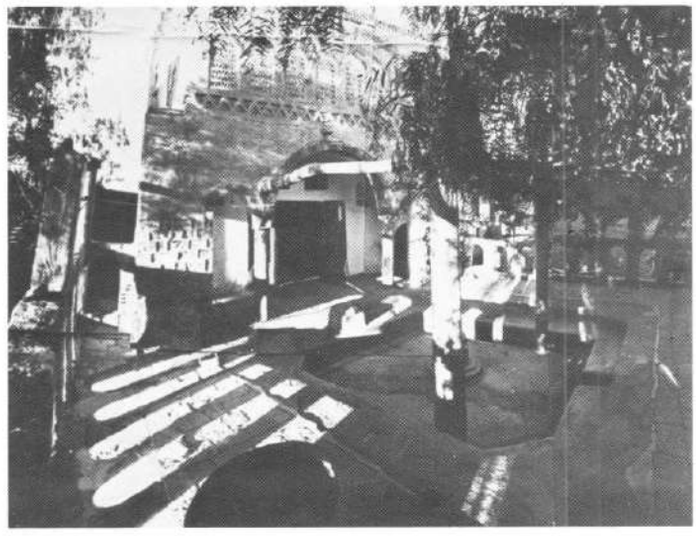
32 He means that he flouts the law in malversation of *waqf* income.
33 *Filāj taflīj*, explained as *al-fataḥāt fi 'l-quṣṣ*, the openings in plaster decoration.



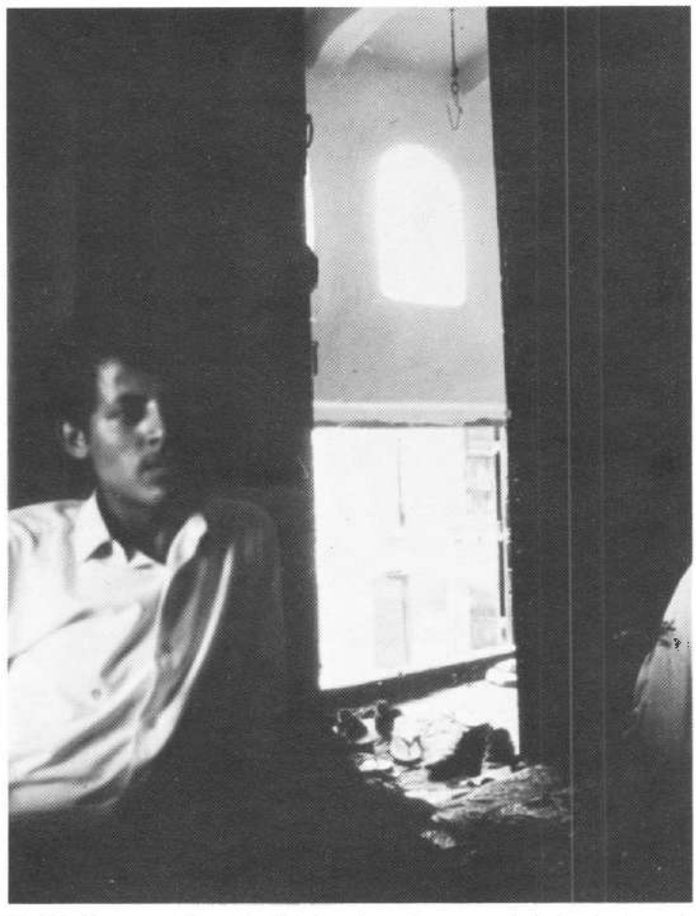
22.105 A fine doorway, all that survives of Bayt al-Filayhī, reputedly built in the 10th/16th century.



22.106 House G. View from the *mafraj* into the garden.



22.107 House G. View towards the house from the edge of the pool, with the *mafraj* behind the arcade.

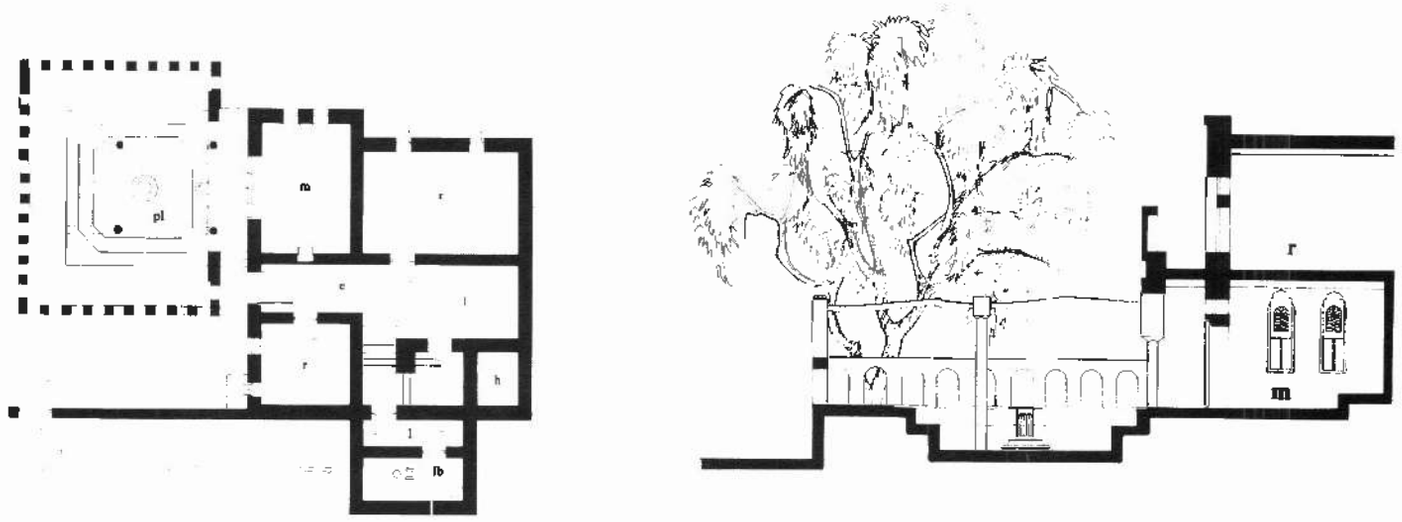


22.108 House at al-Rawḍah. This large house has two *mafraj* related to its pool.

Woodwork: Ceiling beams often come from local *'ilb* (jujube) trees.[34] Door and window frames are simply made of local *ṭunub* wood, or of imported African wood. They do not have elaborate jointing, but there is frequently a single pegged joint in each corner. External doors are made of wide planks fastened to rear rails with decorative-headed nails or studs. There is often a smaller central door which opens within the larger one. Large doors are usually fixed directly to the stone reveal, without a frame. Often the head of the opening is arched, but the door head is rectangular behind it. Sometimes there is an edge beading on the outside with a fretted inner edge or a panel of bas relief patterning (pl. 14.4). Where there is a pair of doors there will be

34 The master carpenter al-Usṭā al-Ḥājj al-'Izzī 'Abdullāh provided much of the data given here. He lives in Shārī' al-Ṭabarī in minṭaqat al-Ṭabarī about Bāb al-Sabāḥ, the old Bustān al-Ṭabarī inside the walls, not built upon before the 1962 coup d'état.
Ṭunub, he said, is the only local wood used in carpentry, it is the most enduring and strongest kind (*aḥmal wa-aqwā ḥājah*) and comes from Anis, Sharis, al-Ḥaymah al-Sharaf, Lā'ah and al-Maḥwit. *'Ilb* wood is used for ceiling beams. Benteak headed his list of imported timber, commonly used for making frames (*al-fayyārāt wa-'l-lawāl/lawālī* = *lānah* of Ḥaḍramawt). Other imported woods are pine (*ṣanaybir*) called *sukkār* in Ṣan'ā', *Ḥabashī*, *Mirandī* (Malindi ?) and now *Kīnī* (Kenyan). *Sāsam* wood is nowadays said to come from Ḥajjah. For Carpenters see also Landberg, *Ḥaḍramoût*, 338.

Fig. 22.10 House G. One of the villa-type houses with a *mafraj* at ground level looking over a pool with fountains. Plan and section.



a central cover strip. This is decorated with an extended base and capital treatment as though it were a long thin column. Often the shaft has a shallow flute or two. The 'capital' and 'base' are frequently identical.

The traditional type of door is termed of the *mash* type, the vertical planks (*lawḥ janb lawḥ*) held together by a series of horizontal bars, the vertical planks are known as *ṭabliyyāt* and the cross-bars as *'awāriḍ*. Another name for the latter is *'awābir*—in a door onto the street, the *'awāriḍ* are in front of the door (*fī wājihat al-bāb*), but *'awābir* are bars behind a door (*min qafā*). The topmost inside cross-bar is called *rādif* (pl., *rawādif*).

Internal doors and shutters are framed with two, four or six panels per pair. The panels often have ornamental, fretted shapes framing them. Patterns in low relief are carved into the surfaces of the panels or fretted into thin veneers which are applied afterwards. Occasionally the panels are thick slabs or wood fielded. Lattice screens to projecting window boxes are either framed with silhouette fretted panels let into them (pl. 22.122) or made up of slats spaced apart crossed by other slats at right angles (*shabābīk mukharramah*) which can be *Turkī* or *'Arabī* and are something like *mashrabiyyah* work.[35] Water is placed in them to cool. Two-flap window shutters, the flap being called *sharshuwah*, (pl., *sharāshū*) or a window frame inset with a smaller window shutter, (*ṭāqah ma'a shāqūs*) are alternative designs.

The *shāqūs* (pl. *shawāqīs*, Rossi. Term 353) are tiny windows with or without glass set in plaster or a small wooden door in big window shutters.

Joinery: Joining wood seems to be called *ḥashū*, which in standard Arabic means that with which something is stuffed or filled. A *farz* is also a bar of wood (a tenon) fitted into a hole (a mortice) cut out of another piece of wood, the whole being known as *dhakar wa-unthā*, male and female. There is a *ḥashū 'Arabī* and *ḥashū Turkī*.

In the diagram of a joinery door the frame is *fayyārāt*, the *lawālī* are the jambs, the pieces inside the frame are *wāṭī*, and the panel inside it *muṭalla'* or *umṭalla'*—the whole seems to be called *ḥashū muṭabbaq*.

This type of door has no bars (*'awāriḍ*). Knots in wood, according to their various shapes, are called *rukbah* (pl., *rukab*), *'aqd* and *nukhrāt*. Sometimes, though rarely, interior doors are painted with oil-paint (*duhān*, in Aden *rang*).

Door bolts and locks: Sliding door bolts are made of wood with decorated ends fitted with rings through which a finger can be passed for extra leverage. As described above (p. 441a-b), a street door has at least two such bolts, possibly more. In addition there will be a lock. This has a wooden sliding bolt controlled by a key. Two types of lock are in use. The older has four, six or eight pins which fall separately into place through the bolt preventing it from moving (pl. 22.126). The pins are lifted up by a long thin wooden key with matching prongs which is passed down the centre of the bolt, or through a hole at right angles to it. The key has to be moved with the bolt. A disadvantage of this type of lock is that it can usually be opened from only one side, i.e. either inside or outside. The second type of wooden lock has an iron key passing through a hole in the door at right angles to the bolt and operating past an identifying profile to turn a wooden bolt which is notched. The key catches one notch at a time and must be turned many revolutions to move the bolt throughout its length. There is, in addition, an external padlock passing through a clasp and ring, which is used for locking shop doors. The padlock (*qufl Ghuthaymī*), of a well-known type, mainly from Ṣa'dah, has two parts which close together and are then held closed by strong springs. The springs can be moved only by a special key which forces them together so that the parts can be separated.

Hinges and catches: Large doors are pivot-hinged. Smaller doors, shutters and modern glass sashes are hinged on the sides using metal hinges. Yemenite construction is remarkable in that a kind of hinge is employed which permits the whole window or

35 Sing., *shubbāk*, not a word native to the Yemen.

door to be assembled and fitted to its frame, complete with hinges, catches, bolts and locks, on a workbench in a carpentry shop (pl. 22.125), and then unhooked from its hinges while the frame is fitted into the masonry of the building in its final position. Re-assembly takes only one or two minutes and the whole opening unit is finished. This is done by using a hinge which is essentially a hook nailed to the opening element, fitting into a ring on the outer frame. Two such hinges are fitted to each shutter and three to each door. As later adjustment is never necessary, screws are not used, the ring having a spike at one end which is nailed into the frame, the hook then being passed through it and its position carefully checked before it is nailed into the sash, shutter or door. A further advantage is that elements may afterwards be freely unhooked and removed for repair. The same type of hook and ring (*khuṭṭāf*) is used as a latch for shutters and windows.

The metal furniture of the door is of iron 'tinned' with lead (*ḥadīd mubayyaḍ bi-'l-qaṣdīr al-abyaḍ = al-raṣṣāṣ*) and is of local production (*intāj maḥallī*). The hinge (*khuṭṭāf*, pl., *khaṭāṭīf*) has a hook which catches in a ring (*wa-rizzah*, pl., *rizāz*). A *qallābah* (pl., *āt*) is a hinge in reverse below an upper hinge inserted into the *rizzah* from beneath. *Qallābah* also seems to mean a catch.[36] A shaped latch is called *lā'ib*. The main lock (*maghlaqah*) has above it a *ma'laqah mijarr* attachment for the draw-rope by which the outside door can be opened from upstairs. *Mahāzir* (sing., *mahzarah*) *muḥallayāt* are ornamental rings linked to a shallow half-cup and tinned, and the door is further garnished with white ornamental nails (*masāmīr muṣabbarah*) on the *'awābir* bars. The top of the door sometimes has a *rijl khashab*, i.e. a wooden piece projecting from the top of the door on the hinge side and set in the frame to act as an upper axis, while on the lower end of the outside door would be an iron projection to act as the lower axis set in a metal shoe (*rijl ḥadīd min taḥt ma'a 'l-kharazah*).

Door knockers (*madaqqah*): A flat-shaped plate of iron tinned over serves as a door knocker, hanging on a ring and tapping against a large stud in the door (pl. 22.20). The knocker is decorated with hammered circular marks in patterns; it is usually mounted on a thick wooden backing, which is shaped in silhouette to a decorative profile. The knocker is used by familiars of the household to sound a distinctive knock peculiar to that house, after which the bolt can be pulled back on its cord from upstairs, without anyone needing to descend.

A sort of metal boss on doors is called *ṣubrah*, and an embossed door is said to be *muṣabbarah*. Sometimes a boss has a ring set in it. Ornamental metal crescents on doors can be confidently stated to go back to worship of the Moon God in the pre-Islamic era.

Windows: The *'aqd* or circular or half-moon shaped window for light above the lower, shuttered window opening used to be made of alabaster (*'aqd ḥajar/qamarī*, sing., *qamariyyah*) from al-Ḥarrah of Banī Jarmūz, shown on von Wissmann's map as north of the airfield of al-Raḥabah. This is expensive and not much used nowadays as they say, 'you have to search in the mines for a long time in order to find a suitable place.'

Imported glass is said to have killed the *qamarī* (*al-zujāj al-mustawrad a'dam al-qamarī*), but coloured glass has been employed for some time (see p. 492a) in the *'aqd zujāj*; it is said to have been originally imported from Syria or Iraq. Sometimes nowadays white glass with moulded relief patterns (*al-zujāj al-baradī/al-thaljī*) or coloured *shajarī* panes with moulded patterns are used, and even more recently coloured plastic panes which are less attractive.

Window tracery is made by a special craftsman in a workshop away from the building site. A slab of gypsum plaster is laid 4 or 5cm thick on a flat board which is slightly larger than the size of the window. Before this has set a pattern is sketched on it, mostly by eye, a slab of plaster slightly smaller than the space between the lines. When the slabs have been removed on either side of all the lines the pattern is left behind in plaster ribs about 1cm wide on face, 4 or 5cm deep and 2cm wide at base, resting on the setting-out board (pl. 22.127). After a final trimming this gypsum plaster tracery is left on the board for two or three days until it is quite dry and strong. If the tracery is to be fitted with coloured glass, another board is placed on top, the whole is turned upside down, and the back board is removed. Pieces of coloured glass are then cut roughly to the shape of each space in the tracery and laid in position. Finally, another 4 or 5cm of gypsum plaster is laid over the whole window, and cut into the same pattern before it is dry. The skill of these window makers enables them to remember the position in which they should place the knife to make the cut correctly for each part of the pattern. Apprentices make the cut slightly into the spaces, which gives them latitude for error, but this is slower as each bar of the tracery then has to be pared down until it is the correct thickness. When the window is completely dry two or three days later, it is strong and solid and can be carried to the building site for fitting into place. Even the single openwork tracery, unglazed, is amazingly strong and resistant to shocks; it can be carried and is used for the outer tracery screens of the windows, in which position it is apparently capable of surviving for several centuries.

The cost of a large traceried window in coloured glass was always very high, the figure quoted in 1974 being 5,000 *riyāls* (= £500). Much of the finest work in *quṣṣ* plaster windows was done by Jewish craftsmen before the mass emigration of 1949-50.[37]

Occasionally a projecting water-cooling box was made in *quṣṣ* tracery—there is, for example, one on a house near Bāb al-Shu'ūb.

Stability: The thickness of the walls of the Ṣan'ā' houses decreases gradually as the building rises in height. Nevertheless, the walls at their base seldom exceed 70cm thick, and the daring of the architects in building houses which are often more than twenty-five metres high remains surprising. Although collapses have been known, they are rare and usually limited to the outer wall nearest the street. This seems to support the theory that the real strength of the house lies in the staircase, the massive central pier joined to its outer wall by beams and stone steps constituting a braced structure usually more than four metres by five metres which serves to stabilize the remainder of the house. This is supplemented by the system of division of the building into sections, each approximately three metres wide, by crosswalls, described on p. 468b.

The wooden bands running around the houses at lower levels must also contribute considerably to their stability.

Proportioning: Ṣan'ā' builders prefer proportions derived from the perfect square, either singly or in multiples. Square windows and shutters are common. Usually, square doors are too wide, and then 3:2 is the favoured proportion. Important rooms are normally square in cross-section, and either two or three squares in plan.

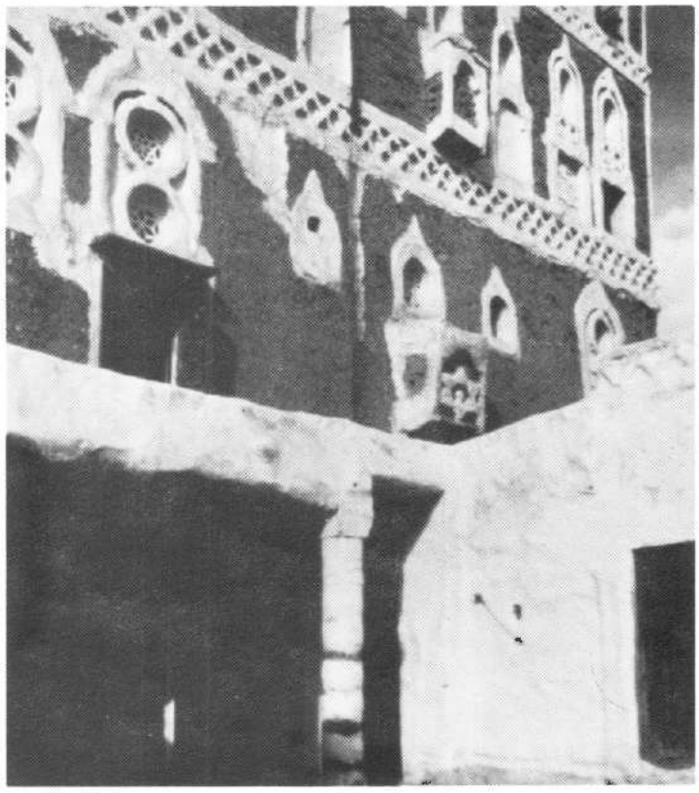
Decoration

External decoration consists in the ornament on the door itself, already discussed, the ornament around the door, the friezes and decorative patterning of the upper wall surfaces, and symbols attached to parts of the exterior.

Ornament around the door has clearly changed with time. The oldest house doorway known, a blocked doorway on house M in the Ṭalḥah Quarter (fig. 22.12), has a single stone lintel capping the door opening, which is flanked by curious blank trefoil arches in two colours of stone, red and yellow. A wooden beam spans

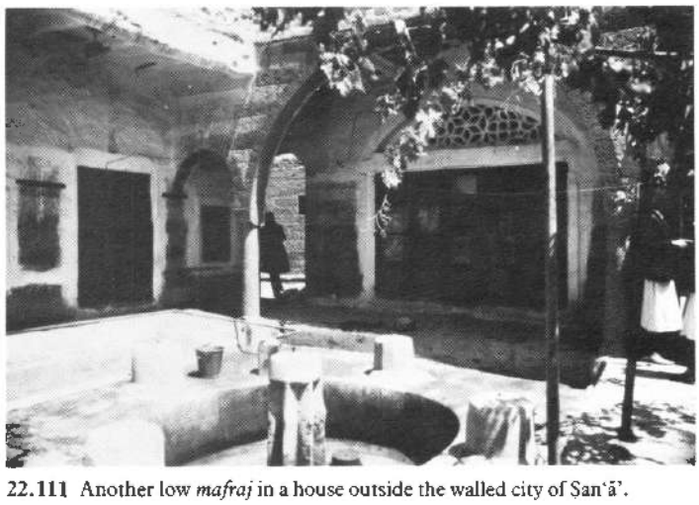
36 Fixing the windows and doors is clearly felt by the carpenters to be a ticklish business, for one of Qāḍī Ismā'īl's unpublished proverbs runs, *'Ind al-tarākib yikhru 'l-najjārīn*, when it comes to fixings, the carpenters shit.' This is because it gives them far more trouble than the actual carpentry itself.

37 Both points on the authority of the Deputy Minister of Public Works, Qāḍī 'Alī Abu'l-Rijāl.

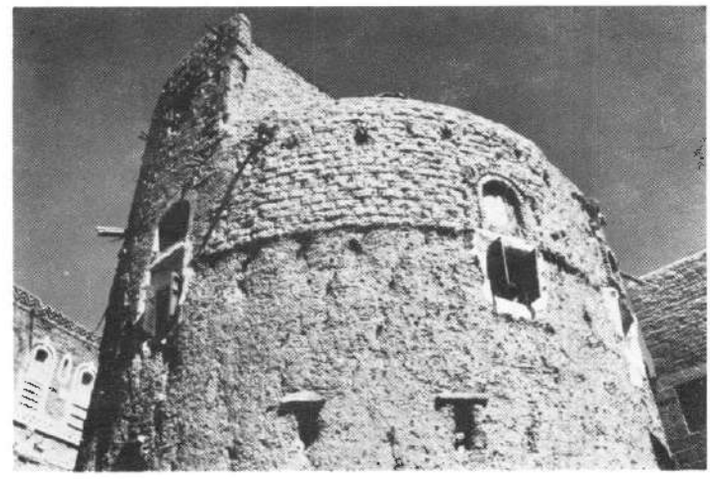


22.109 House at Rawḍah. The house seen across the pool. Note the first *mafraj* at its base.

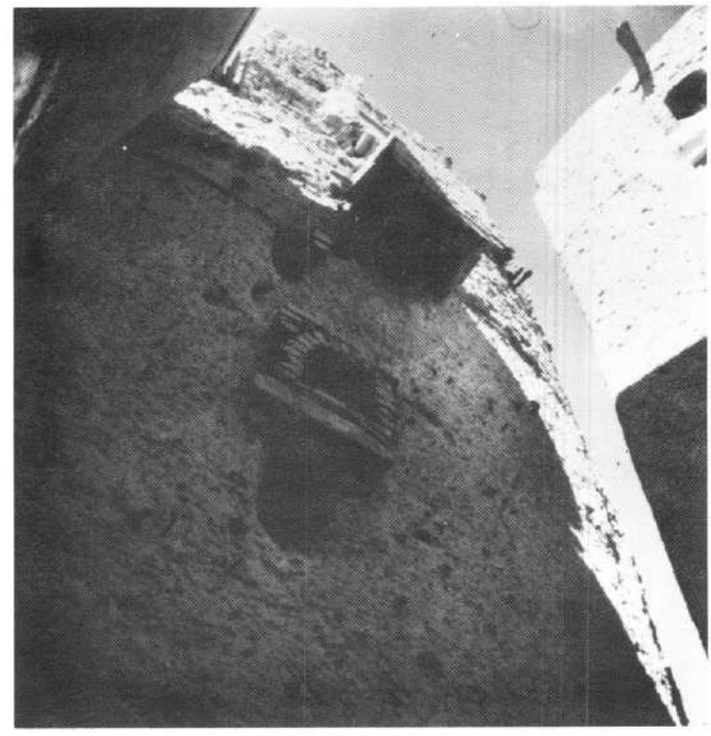
22.110 House at al-Rawḍah. The second, separate, *mafraj*.



22.111 Another low *mafraj* in a house outside the walled city of Ṣan'ā'.



22.112 A *nōbah*. Exterior view.



22.113 A *nōbah*, seen from below looking up.

across the top of the stone lintel, and this is decorated with patterns of studs and nails. On it rests a frieze of flush triangular stones, alternately yellow and red, below a wooden strip which runs right around the house. Above this is a plain band of stonework and then a band of intricately fretted stones in alternating colours, the same width as the lintel. Two courses up, beyond this frieze on either side, are two projecting bosses carrying what appear to be bulls' heads, like those above the north west doorway of the Great Mosque (p. 346b).[38] Finally, a course above them, there are three slit windows, the central one with a fretted head in scalloping, and the outer two with pointed heads.

Older houses have very little ornament around the doorway, simply a number of vertical slits ending in curved or pointed arches in an area of the wall above the door. These, of course, light in the entrance hall (pl. 48).

House S, also reputedly a very old house, has a curious parabolic relieving arch above the flattened arch over the entrance door. This frames a stone panel containing three vertical slit

38 They resembled the bulls' heads projecting from pre-Islamic buildings in South Arabia as water-spouts.

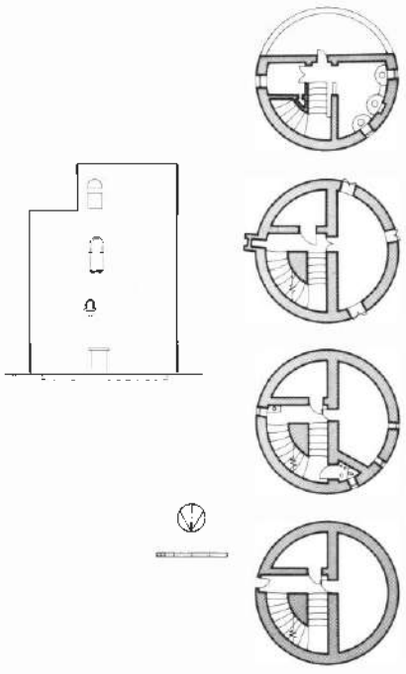


Fig. 22.11 A *nôbah*. Plans and elevation.

windows. As in the case of the slits described above, these have the shape of their heads emphasized by a double frame made of grooves carved in the stonework. It seems possible that the upper arch was part of a pointed arch decoration which was executed in plaster and has since been stripped off.

The typical door treatment of a large fine house (pls. 22.69 and 130) has an outer ashlar frame surrounding the ashlar frame of the street door. This outer frame steps in just above door height, the steps being carried by a moulding of two circular bosses carved in the stone; the frame then continues up to become a high circular arch containing a thin stone wall or slab pierced with a large number (eight or ten) of vertical slits with semicircular or pointed heads. The curious moulding of two circular bosses may derive from a conventionalized Ionic capital of the type shown in pl. 15.36, or, more likely, it is an expression of an old practice or reinforcing the wall at this point with several headers made of wood logs built into the stonework, which may still be seen in a few houses.

The outer edge of the ashlar frame of the upper arch is narrower than the frame at door level, because of the stepping-in mentioned above. The lower vertical lines are usually carried up across the stone surface of the house wall with two strips of plaster ornament representing mirror halves of a conventionalized *dhurah* shoot or *fleur-de-lys* type decoration. A smaller version of the same motif, complete, is made in plaster bas relief on top of the upper arch to cap the whole composition. Sometimes this is contained within a flower-bud shape. An old doorway (9th/15th century ?) preserved from the destroyed Filayḥī house, rebuilt nearby, has a scalloped upper arch, containing a pointed arch window above a wooden lintel (pl. 22.105). There is a similar scalloped arch above the door of house F, said to be almost as old.

Other houses have occasional abstract or emblematic patterns let into the stonework of the lower storeys in a differently coloured stone. Similar uses of two colours of stone may produce horizontal stripes and alternating coloured voussoirs in the arches above the windows (pls. 42 and 22.130).

A band of *decorative brickwork* separates the stone lower wall surface from the brick surfaces above. As in bands higher up between storeys, or the crowning cornice band, this decoration usually consists of variations on a zigzag motif. Double and triple lines of zigzag are common, held between horizontal lines, each a half-brick in thickness. By breaking the continuous zigzag lines and joining parallel lines together to make V and W shapes an almost infinite number of varied patterns are made (pls. 82 and 84). Loops are sometimes introduced at the points of the zigzag lines, well executed in cut brick, and in older houses these harmonize with the circular windows which used to be fashionable above shutters (pls. 77 and 83). If the loops appear above a single zigzag, foreign observers have remarked that the pattern resembles a row of ibex heads, but such symbolism is probably unintentional. Another variation introduces diamond shapes in the interstices between the zigzags (pl. 18). Older patterns which are less frequently seen include a series of ≷ shapes, ≲ shapes, or the two used together in varied combinations. There are also lozenge ◇ shapes, sometimes with an infilling of a smaller ◇.

Older houses have upper windows for light, above their shuttered openings, which are made of one, two or more large circles (originally filled with alabaster, see above, but in some cases afterwards renewed with coloured glass). The circles are often contained in a decorative frame which resembles an arched window; the solid areas between the circles are then ornamented with motifs which are taken from those used in the horizontal bands (pls. 82 and 22.130). Often these upper fanlights occur over a space between two shuttered windows, as in the case of five fanlights over only three openings. Then the frame of the fanlight is extended down over the blank wall below and the empty space filled with a sizeable area of decoration. Although these areas are genetically the same as the horizontal patterns, they are the richest and most imaginatively decorated in the whole wall surface. Occasionally a lattice effect is produced, not unlike a pierced screen, while other surfaces resemble hanging necklaces or festoons, although they follow straight and not curved lines (pls. 22.129 and 130).

The decoration in fired brick (*naqshat yājūr*) which forms the cornice of a Ṣan'ā' house is named from the fact that it is normally two bands, *al-ḥizāmayn*. These bands are said to project to deflect the rain (*hī maradd miyāh al-maṭar*). In country districts these may be in stone, if the walls up to the roof are stone, in which case the string courses between the storeys will also be in stone, usually *ḥabash* (*yufṣil mā bayn al-dawr al-awwal wa-'l-dawr al-thānī*).

Stars are often introduced; eight pointed stars are common, and five pointed stars are known. But the most interesting of the star patterns frequently found is the shield of David; this six-pointed star, formed of two crossed triangles, adopted as a common Jewish symbol in the Middle Ages, and universally recognised as such in modern times,[39] occurs not only on houses known to have been Jewish in the al-Qā' quarter, but is sometimes found emblazoned centrally above the doorway of houses in the old city. One of these houses is accepted by local scholars and by the present owners as a house built more than 350 years ago by Jews, before their expulsion from the old city (Bayt al-Ghurbānī, Ḥārat al-'Alamī, pls. 22.136 and 137). Several other houses in the same area which have the shield of David prominently displayed retain architectural peculiarities (see below) which make it probable that they are remodellings of Jewish houses originally built before 1660. But the fact remains that this decorative feature is incorporated in houses, and even in a few mosques, where it was clearly disassociated from any Jewish significance. This so-called Shield of David is known as Khātam Sulaymān, Solomon's Seal, in Ṣan'ā'. It was said that the Arabs only learned of its significance as a symbol for the Jews after they had left the Yemen, and they considered its employment as a decorative motive in their houses

39 Scholem, G. G. 'The Curious History of the Six Pointed Star', *Commentary*, New York, 1949, VIII, 243-51.

to be a Jewish trick. It may well, however, be a pattern of some antiquity, not specifically Jewish.

Not part of a pattern, but sometimes found on the corners of houses about seven metres above street level, are symbolic snakes. In country areas these are sometimes executed in iron, and project from the corners. But on the old buildings in Ṣan'ā' which retain them they are carved in relief on stone. House B has three superimposed coiled snakes on the south corner (pl. 22.56) and three on the north. There are two sorts of snake, it is said, the *ḥanash* made in black stone which is malevolent (*sharr*) to keep off an enemy, and the *ḥanash* in white stone that is benevolent (*khayr*).[40]

Another feature occasionally found in Ṣan'ā' houses is a pair of ibex horns projecting from one or more corners high up on the building.

The arched panels of the upper windows are usually framed by double arches, one inside the other. The origin of this characteristic feature may lie in the frequent practice of reducing the size of the fanlight over the shuttered opening to correspondingly diminish the size of the sheet of alabaster or the panel of coloured glass necessary in the opening. An alternative explanation is that the span of the arched opening is reduced in this way for structural reasons. Certainly the two arches are stronger than one, but then the inner arch stands on the head of the shuttered opening below. Unless one can accept that there is a corbelling principle operating here, which seems unlikely in view of the way the bricks are laid, or that the wooden beam which usually acts as a lintel to the shuttered opening is strong enough to transfer the loads of the inner arch, which is not always the case, this double arch principle may be said to weaken the structure rather than strengthen it. There remains the possibility that the double arch is largely decorative in function, resembling quite closely a similar device in houses of the Middle Ages in the Byzantine empire. The double arches are usually linked at the top, often with a pointed fillet. There is frequently another pointed fillet above the outside arch, and occasionally flanking half *dhurah* shoot or *fleur-de-lys* decorations as well (pls. 71, and 22.54).

Besides simple arches, trefoil arches and those with an arch rising out of a flat head (pl. 77) are found, particularly as heads to blank brickwork panels and frames around clusters of kitchen ventilating holes. Blank brick panels also commonly have corbelled heads. Pointed arches are seldom seen, and then only in a few very old buildings.

Parapets are of two kinds. If low, they are expressed on the facade as wide bands of decorative ornament, resembling those which separate the storeys below. If the parapet is high it is often pierced to allow people behind it to see out. Or at any rate it will include a pierced masonry water cooling box which projects from the facade. The external expression of a high parapet is usually to treat it as a series of blank panels with arched heads, and with the frames outlined in limewash. Occasionally the panelling is decorated with patterns, and more rarely, ornamental circular openings are introduced. Finally the house may be crowned with decorative masonry finials, or with open or screened plaster-on-brick arcading against the sky (pl. 22.69).

Internal decoration is of two types, the alabaster-plaster dado used to embellish entrance halls, staircases and lobbies in the older and finer houses, and the plaster bas-relief decorations of the main reception rooms.

Two types of pattern were most commonly used in the former, the *dhurah* shoot pattern, resembling the *fleur-de-lys*, and a key pattern, a simplified form of the Hellenistic pattern found on ancient decorated stones in South Arabia.[41] The latter, bas-relief decoration, has a variety of detail but a general character which again seems related to the ancient vine ornamentation commonly found on pre-Islamic decorations in the area (pls. 18.21, 27).

The Age of the Houses

The Age of the Surviving Houses

The upper storeys of Ṣan'ā' houses are generally more recent than the lower parts. There are various reasons for this; the thickness of the walls diminishes as the buildings rise in height, and at the same time the window areas are larger, leaving smaller pieces of brickwork to undergo weathering, wind stresses and cracking; Ṣan'ā' builders are fond of pointing out that a small crack at the bottom is magnified many times when it reaches the top; also the rooms which are likely to need remodelling with changes in fashion are the reception rooms of the upper storeys; finally, the houses of the wealthy Ṣan'ānīs have on a number of occasions been sacked by tribesmen, when the *mafraj* was sometimes destroyed by fire, but usually little damage was done to the lower parts of the structure.

It therefore seems wise to begin with a consideration of the age of the upper parts. Craftsmen are still at work today re-decorating and rebuilding entertaining rooms such as the *mafraj* and the *manẓar* in old houses, using traditional techniques with a quality of execution that is hard to distinguish from work of the last century. So stylistic criteria are not very reliable guides to age. Some reception rooms are dated (e.g. house B, which has a *mafraj* dated 1322/1904-5. These permit the conclusion that many top storeys date from before the beginning of the century. But in most cases, we have to resort to the oral tradition and to documentation. The latter is weak because it does not as a rule specify which part of the house was built at which time, although in any case few documents have been seen by the present authors, as is discussed further below. Oral tradition asserts that a number of the older houses have upper reception rooms more than one hundred years old.

The age of the lower storeys, that is the entrance levels, the storerooms, the first living floor and sometimes the *dīwān* floor is often considerable. Techniques for establishing the age include documentation, stylistic change, and family tradition.

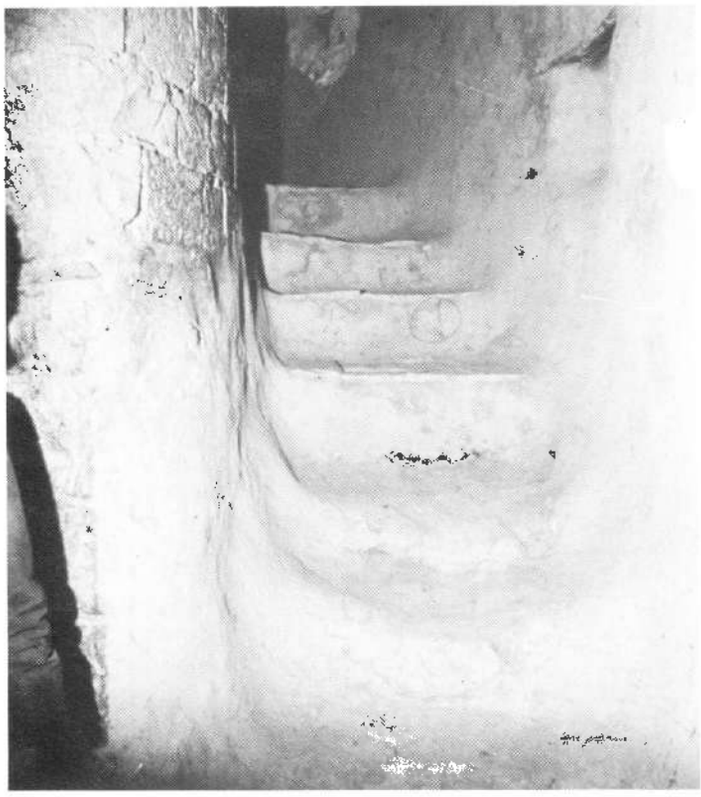
Documentation exists in the form of house deeds (*baṣīrah*, pl. *baṣā'ir*). That is, deeds of grant or sale of the property; and there are also wills, which often describe the property and the building.[42] Although owners of houses frequently divulge the dates on these documents, they are generally loath to produce them for the perusal of strangers, so that their word has to be accepted on dating. Occasionally it was possible to obtain the corroboration of reliable *qāḍīs* who had read the documents. Using this somewhat unsatisfactory evidence, the oldest house found was in Ḥārat al-'Alamī near al-Filayḥī Mosque, which was attested by two independent sources[43] to the 6th/12th century. (One source

40 Qāḍī Ismā'īl al-Akwa' reports that snakes are represented on buildings as talismans against live snakes. Other such talismans existed in the 4th/10th century, for al-Rāzī, *Tārikh*, 203, says, 'Ṣan'ā' is surrounded with talismans against vipers and snakes (*al-afā'ī wa-'l-aḥnāsh*), so that vipers and snakes can hardly harm anyone, and a person stung who has died from that has never been heard of . . . One of these talismans is of iron and the other of brass (*ṣufr*) and they were on the Gate of Ṣan'ā' town, the first, in the place known as al-Qaṣabah, was a thing made in the Jāhiliyyah (the pre-Islamic age), and one of them, it being of iron, is on Bāb al-Miṣra' where the blacksmiths (*al-ḥaddādūn*) work today. The other is at Bāb al-Kishwarī/Kashwarī, it having been known as Darb al-Kashāwir but today it is known as Darb Ibn 'Abbās on the edge of the Market of Ibn Mā'iz from the direction of al-Madāwir of Ṣan'ā'.' *Darb* probably means a Quarter in this context, but we do not at present know what is described under the term al-Madāwir.

41 Cf. Rathjens, *Sabaeica* I, fig. 64.

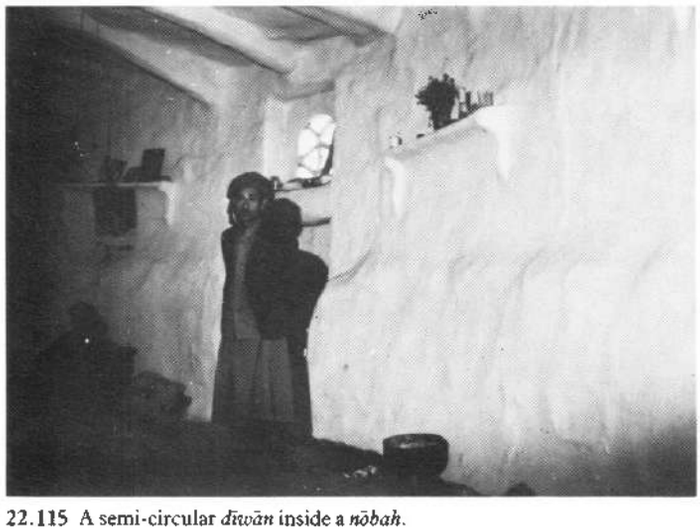
42 When a house is sold the *qāḍī* cancels the old one, this being called *ta'ṭīl al-baṣīrah* and writes a new one. To measure a house is *labana 'l-bayt (albin*, I measure), doubtless from the land measure known as *libnah*, and a surveyor is *labbān, massāḥ*, but *bannā'i* was mentioned as a measurer of land. When a house is sold the agent (*dallāl*) gets 2½% of the sale-price. The fees of the *labbān* are said to be high, there is however no taxation on the sale of houses or land.

43 Qāḍī Ḥusayn al-Sayāghī, Secretary of the Ministry of Justice, and Qāḍī 'Alī Abu'l-Rijāl, Deputy Minister of Public Works.

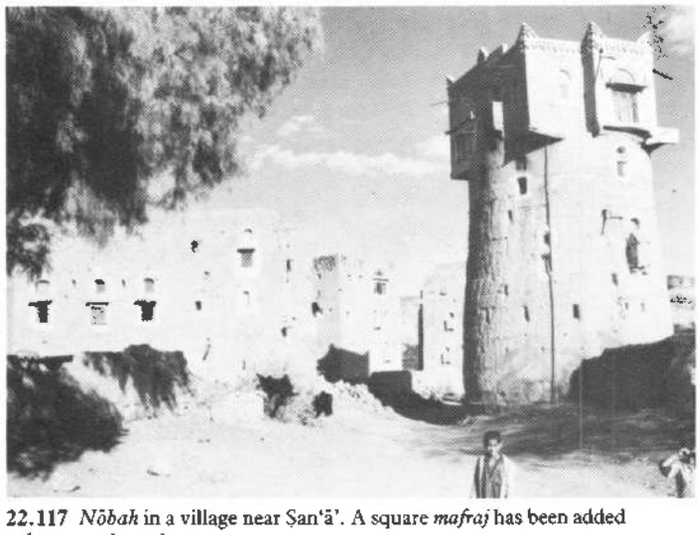


22.114 The staircase inside a *nōbah*.

22.116 The staircase of a *nōbah*, looking down.



22.115 A semi-circular *dīwān* inside a *nōbah*.



22.117 *Nōbah* in a village near Ṣan'ā'. A square *mafraj* has been added subsequently at the top.

believed that it could be as much as two centuries earlier than this.)[44] Strangely enough, the lower levels of this house are built of coursed clay and unbaked brick plastered on a rubble foundation (pl. 22.131); it has small circular windows; the surviving upper-most storey is clearly a recent replacement.

Bayt Ṣarḥat al-Wardī, near Bāb Shu'ūb, is by the same evidence dated to the 9th/15th century. Bayt Dhulal in Bīr al-'Azab, although the topmost storeys were destroyed in the sack of 1948, is mostly from the 10th/16th century. Then there is a number of houses for which documents are said to exist dating them to the 11th/17th and later centuries. House B (fig. 22.6; pls. 22.53-62) near Sūq al-Milḥ, belongs to the early 11th/17th century, although the whole rear block was added later, and the present *mafraj* is dated 1322/1904-5. House H (fig. 22.6; pls. 22.53-62) in the Sakhrah district, belongs to the third quarter of the 11/17th century.

For the remainder of the houses it is necessary to revert to oral tradition. But since most of them have remained in the same family for centuries, and are part of quarters for which a good deal of traditional history is known by the local inhabitants, this evidence cannot be entirely valueless, providing several independent witnesses are carefully selected and questioned. Following this technique, the oldest houses are said to survive in the Ghurqat al-Qalīs quarter near the citadel, one of which, a small house, is pointed out as dating from the 5th/11th century, while other old houses are found in the adjoining Ḥārat Zabārah. In the latter quarter, the ruined lower storeys of house S (fig. 22.5; pls. 22.43-52) are said to date from the late 8th/14th century, house BT (fig. 22.9; pls. 22.98-100, 102) from 896/1509,[45] house A (fig. 22.9, pls. 22.88-97) from the 12th/18th century. In other parts of Ṣan'ā', house M (pl. 22.104) at Filayḥī is two hundred years old, the top three

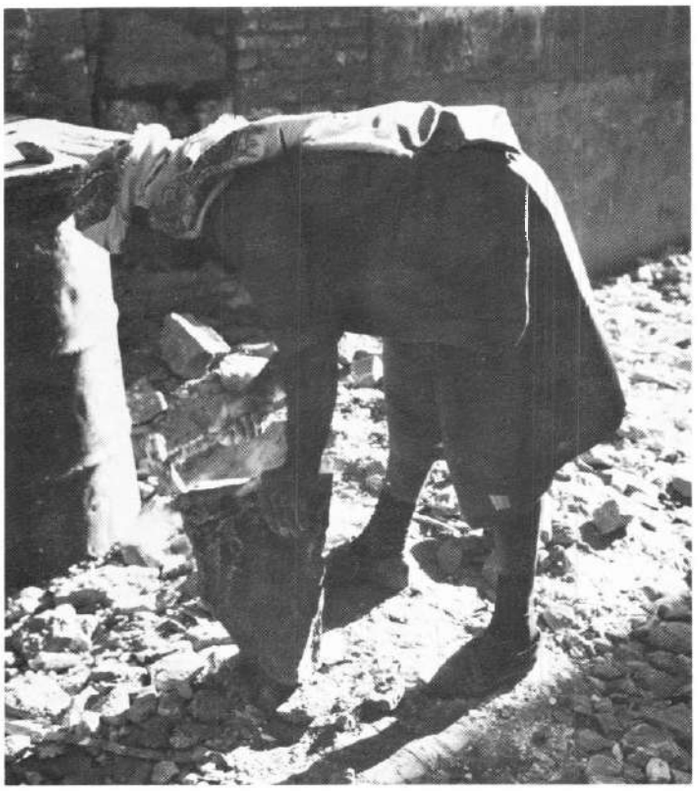
44 The former.
45 Three independent sources gave this precise date.

floors added fifty years ago. House JY (fig. 22.8; pls. 22.69-76) in al-Abhar quarter has the same history. House N (fig. 22.3; pls. 22.19-24) near Bāb al-Salām, is said to be one of the oldest houses surviving in the area, and to date from the early 11th/17th century. House W (fig. 22.1; pls. 22.2-18), in al-Ḥumaydī quarter, is more than a century old, the topmost room having been subsequently rebuilt. House AA, near the Sā'ilah, is a relatively modern house built about seventy years ago (pl. 22.78).

Several houses appear in early Turkish photographs taken in the nineteenth century (e.g. pl. 22.133) which belong to a type which has disappeared, except for the single example of the oldest datable house, in Ḥārat al-'Alamī, mentioned above, of which the old part is only that preserved on the lower levels. The photographs show high houses of baked brick above ashlar stone lower levels. Their distinctive feature is that the lights above the shuttered windows are single circular openings let into the smooth surface of the wall without any surrounding frame to link them to the windows below. Similar circular lights in mosques seem to be earlier than the 11th/17th century, and probably belong to an ancient type. Their resemblance to the high 'false' lights of the outside walls of the 3rd/9th century mosques of Samarra is striking.

Stylistic dating is not very valuable for dating houses built less than three hundred years ago. Clearly the rate of change of style was extremely slow until recent times. Nevertheless it is possible to point to some features that date a house as relatively old. Stepped stonework went out of use a hundred years ago, according to stonemasons, and is likely to have been rarely used for quite a long period before that. Associated with it in most cases are large beams built into the stonework, whereas more modern buildings either do not have them at all, or have only a few of moderate thickness. Entrance doors in old houses have frequently become sunken (e.g. house F, fig. 22.8; pls. 22.79-87) and one has to descend three or four steps from street level into the ground level of the houses. Older houses, such as the reputed oldest house in Ghurqat al-Qalīs referred to above, have new entrance doors and new ground floor levels, because the street has risen so much that the original door lintel is now only a few centimetres above the road surface. Unusual wooden doors of apparently great age are sometimes seen.

The evolution of windows can be easily read from the buildings themselves, although there is as yet no certain means of dating the earliest. The latter have tracery in brick or stone instead of tracery in gypsum sheets, and naturally much smaller openings in any fanlight (pl. 22.132, top windows). There are not many of these left in Ṣan'ā', but more in towns which reached their apogee in the Middle Ages and have declined since, such as Thulā (important in the 3rd/9th to 9th/15th centuries). The antiquity of alabaster windows is well authenticated (see below).[46] The oldest seem to have been single circular windows, as has already been observed; but pairs of circular windows, one above the other, held in a single, arched frame were also of great antiquity. In houses more than one hundred years old another type of window can be seen. This is a wide semicircular arch opening into the lobby of the *dīwān* level. Sometimes there are windows set back one and a half to two metres, to provide a small balcony. In other cases there is a projecting masonry box for water jars below, and the window is set back slightly in its wide arch. The window is either made up of three circles in early plate tracery, or of several large sheets of alabaster butted together to provide a single surface (pls. 22.133 -135). Houses which are reputedly old have noticeably more



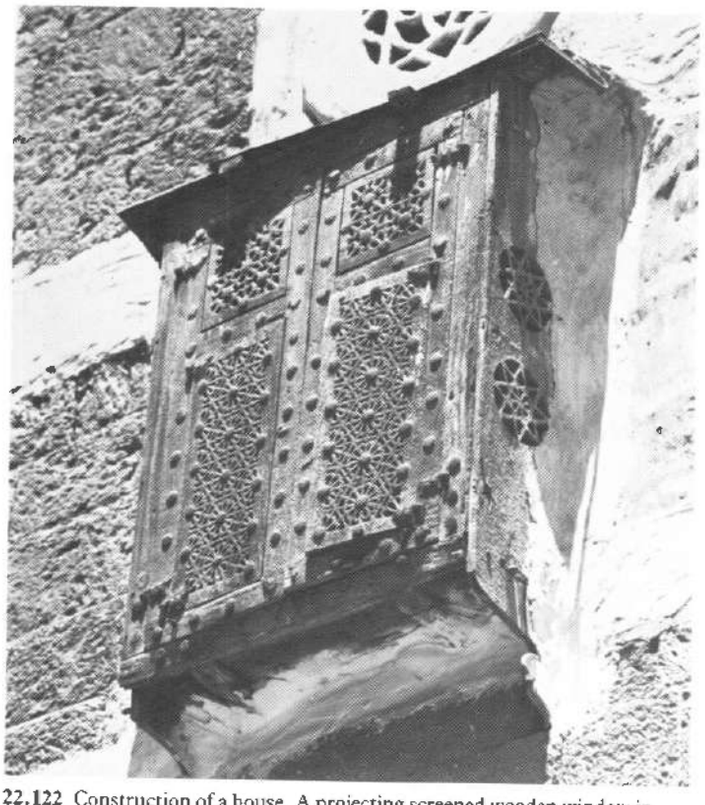
22.118 Construction of a house: A stoneworker expertly shaping a tapered building stone with a square face which will show when built into the wall.

22.119 Construction of a house. Stone courses in an old wall.

22.120 Construction of a house. A brick field, with the bricks, shaped in a wooden mould, laid to dry in the sun before firing in the kilns in the background.

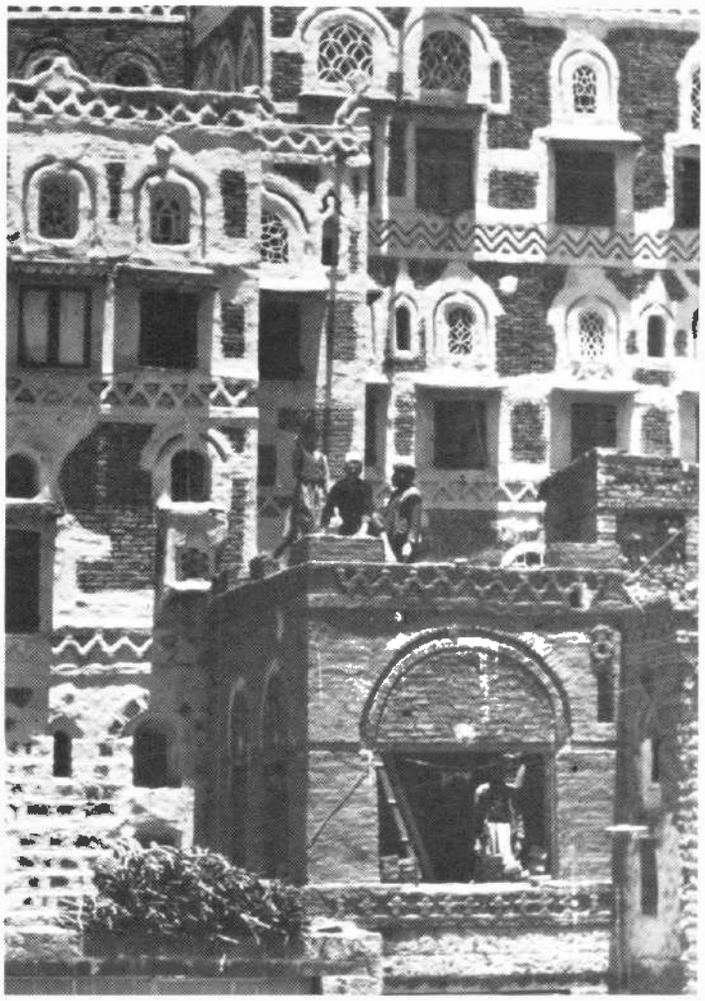
46 The oldest datable alabaster windows are those of the Shibām mosque, which were apparently installed to protect the fine ceiling from damage in the early tenth century. Ronald Lewcock & G. R. Smith. 'Two Early Mosques in the Yemen', *AARP*, London, 1973, IV.

22.121 Construction of a house. Detail of a house front, showing the decorative technique against the background of stone and brick.



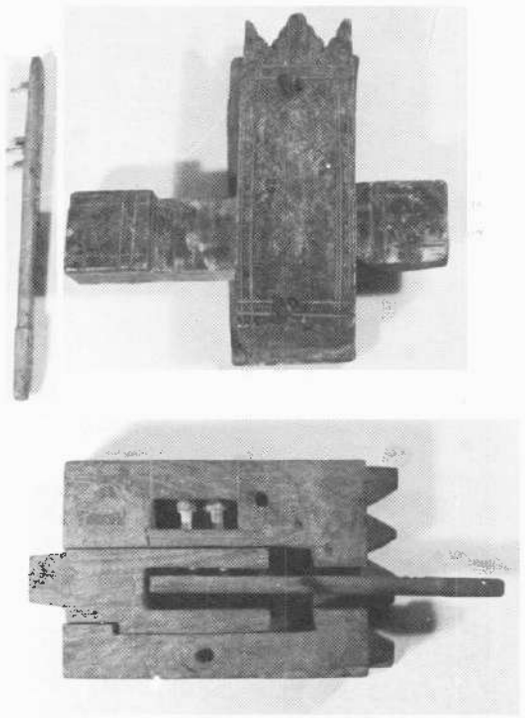
22.122 Construction of a house. A projecting screened wooden window in which water jars are kept to cool.

22.123 Construction of a house. Laying the twigs across the beams of a ceiling. A thick layer of clay on the twigs serves as a sub-floor for the stone paving.



22.124 Part of a house under construction, showing the method of building arches without the use of wooden centering.

22.125 Construction of a house. A carpenter making a window, sashes and frame, to be unhooked before setting in the building.



22.126 Construction of a house. Wooden tumbler locks seen from front and back. Wooden key shown top left.

22.127 Construction of a house. Making a gypsum window by cutting out the pattern from a wet panel.

alabaster windows than recent buildings.[47] Coloured glass was originally inserted in very small pieces into a slab of gypsum plaster, to judge by the oldest examples (e.g. the house near the citadel, and pl. 86). This technique resembles closely that used in the windows of the Dome of the Rock, Jerusalem.[48]

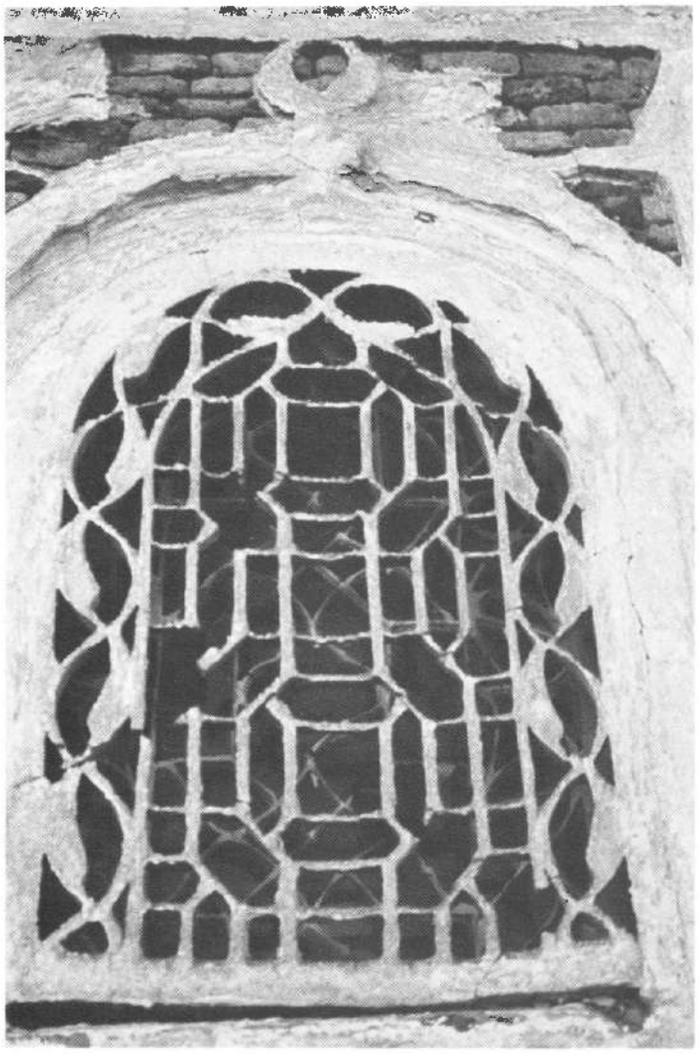
The antiquity of coloured glass in Islamic architecture is beyond dispute. It was used in Christian Constantinople in the sixth century A.D.,[49] and presumably it was under Byzantine influence that it passed into Arab buildings.[50] The earliest coloured glass in Ṣan'ā' is that in the Qubbat Ṭalḥah, which is in

47 Nazīh, *Riḥlah*, 176. 'I passed by some of the places where I saw great alabaster (*marmar*) stones being sawn into fine transparent plates (*alwāḥ*) with special sharp saws. Ṣan'ā' to the exclusion of anywhere else in the world, is distinguished by the craft (*ṣinā'ah*) because alabaster is used for window glass only in Ṣan'ā'.' Cf. Ibid, II, 14.

48 Cresswell 5, plate 3. The earliest examples known in the Yemen are those of the Ashrafiyyah mosque in Ta'izz, late 7th or 8th/late 13th or 14th century, where they both survive and are represented in blind windows as part of the stucco decoration. Ronald Lewcock & G. R. Smith, 'Three medieval mosques in the Yemen', *Oriental Art*, London, 1974, XX.

49 Paulus Silentiarius's description of Sancta Sophia.

50 Khirbat al-Mafjar, ca. 136/740; Mausoleum of the 'Abbāsid Caliphs, Cairo; 7th/13th century.



22.128 External gypsum tracery, in two layers, in front of internal gypsum tracery fanlight.

the style of the original building, i.e. early 11th/17th century (pl. 19.82). Zabārah[51] says that 'Alī Muṣṭafā, of Nahr al-Muṣṭafā in Shu'ūb, originally from Damascus, who came to the Yemen in the days of the Imām al-Mahdī al-'Abbās b. al-Manṣūr al-Ḥusayn, where he died in 1196/1782, was the first to bring glass panes/sheets (*al-zujāj al-alwāḥ*) to the Yemen, and he was known because of them. He brought the Imām al-Mahdī tiles of porcelain (? *alwāḥ al-ṣīnī*) and built a *dīwān* in Bustān al-Mutawakkil and covered its walls with porcelain (*ṣīnī*) tiles. He was concerned with trading and profit in the Yemen. Niebuhr however, in 1763, observed that in the Ṣan'ā' houses, 'Il y entre alors un peu de jour par le moyen de petites fenêtres rondes où sont des vîtres épaisses de Moscovie, que l'on voit au dessus des volets dans l'appartement. Les principaux Arabes ont dans leurs maisons de campagne au lieu de ces fenêtres avec des vîtres de Moscovie quelquefois des vîtres peintes, qu'ils tirent de Venise.'[52] Lower windows, in the houses with early tracery, were closed with grilles made of sizeable pieces of wood or of wrought iron.[53]

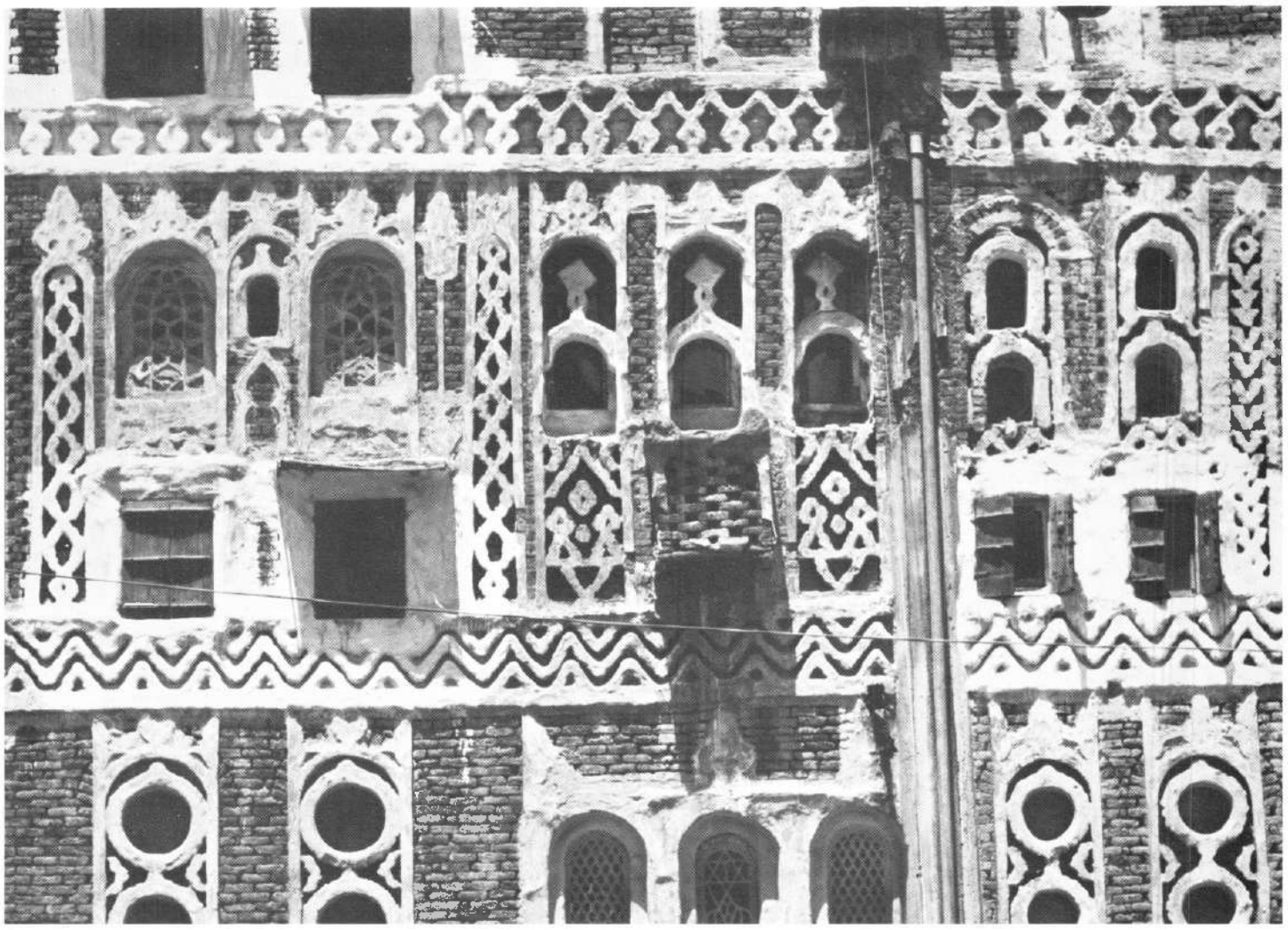
Older houses do not seem to have had a separate structure on the roof containing the *mafraj*; such houses have the *mafraj* incorporated as one of two or three rooms in the top storey of the house (e.g. houses N, NT, S, H and possibly M). However, there is some slight evidence that separate *mafraj* rooms on the roof were built much earlier, see below.

The Antiquity of the Type of Tower House Found in Ṣan'ā'

High houses existed in the Yemen in pre-Islamic times. A Ḥimyarite inscription in Ta'izz Museum refers to the construction of a house with 'six floors and six ceilings'.[54] A stone of unknown provenance shows a graffito of a house with nine storeys.[55] That the great Ṣan'ā' palace of Ghumdān actually existed is attested in inscriptions and in many Islamic histories. It had at least seven high storeys, improbably as many as thirteen, and even twenty, more improbably still, and its total height awed all the historians. Reports of its height vary—one account says it was 200 cubits.[56] It was a square building with its four walls each executed in a different coloured stone: there was a special room at the top 'with windows' each fitted into a frame ('door') of marble, which in turn was held 'in a jamb made of teak and ebony'. The ceiling of this upper room was variously described as being of 'one large slab of marble',[57] i.e. of alabaster, so that [the shadow of] birds flying past might be seen.[58] A high mound opposite the south east door of the Great Mosque, the top of which is actually the highest point of ground of the old city, is thought by both Islamic scholars and archaeologists to be formed of the ruins of this building.[59] It was possibly erected in the mid-3rd century A.D.,[60] and destroyed on the orders of 'Uthmān, the third Orthodox Caliph, in the 1st/7th century.

The appearance of the pre-Islamic house in the Yemen almost certainly inspired the Axumite architectural style recorded in the great stelae of Axum, which are variously thought to date from the third and fourth or fifth and sixth centuries A.D. These include a number of features typical in the Ṣan'ā' houses described above. They have the same formal symmetry, with one great entrance door (fig. 22.12). There are no windows on the ground floor, but small windows clearly express a storage mezzanine above it. The first large windows, marking the first living floor, occur above that. The windows are made up in the same way as the Ṣan'ā' windows. That is, there are wooden shuttered openings shown below, and over each a fanlight with a single large sheet of some material serving as glazing. The top floors are indicated as the most important levels, for on the great stela the top two floors (of the thirteen levels shown) have tracery grilles in the fanlights. There are eight stelae surviving at Axum on which these houses are represented, all with more than seven storeys. The door on the lowest level is carved three quarters full size, above that the scale is cleverly reduced while retaining the effect and all the details of actual buildings. The constructional technique represented has bands of wood encircling the houses, of the type that still survive on many Ṣan'ā' houses. One constructional detail shown at Axum is nowhere seen in the Yemen highlands now. This is the use of lateral pieces of timber running through the thickness of the wall and projecting beyond its face, to form square projections at the corners of the door and window frames, and circular bosses along the wooden bands. But the same techniques do survive in the coastal buildings of the Red Sea in the Yemen and Sa'ūdī Arabia, where rubble stone and clay are widely used in high buildings, as they were in Axum, and in Southern Anatolia.

51 *Nashr al-'arf*, II, 303.
52 Op. cit., trans. Heron, I, 333-4.
53 The oldest examples known are those of Dhū Jiblah mosque ca. 477/1090 and the Muẓaffar mosque at Ta'izz, mid 7th/14th century. Ronald Lewcock & G. R. Smith, op. cit., 2.
54 W. M. Müller, 'Sabaische Inschriften aus dem Museum in Ta'izz', *Neue Ephemeris für Semitische Epigraphik*, 1, Wiesbaden, 1972, 87-89, and J. Ryckmans, 'Etudes d'épigraphie Sud-Arabe en Russe, 9 (année 1972), *Bibliotheca Orientalis*, 1974.
55 C. Rathjens, *Sabaeica: Bericht über die archäologischen Ergebnisse*, Hamburg, 1953-66.
56 Al-Rāzī, *Tārikh*, 21-2.
57 Ibid.
58 *Iklīl, VIII*, 23 seq.
59 See p. 44.
60 See chapter: The History of Ṣan'ā'; and *Iklīl VIII*, 19.



22.129 Characteristic decoration on a Ṣan'ā' house.

The first description of Ṣan'ā' houses in Islamic times occurs in Ibn Rustah's *Kitāb al-A'lāq al-nafisah*,[61] written ca. 290-300/903-913. He says that there are 'good dwellings (*manāzil*), some above others', presumably meaning that they rise up behind each other to obtain the view and sun. 'Most of them are adorned with gypsum (*jaṣṣ*), baked bricks (*ājurr*), and symmetrical stones. Some have foundations of gypsum and baked bricks, while the rest have beautiful symmetrical stone. Some of the ground floors are constructed with gypsum and baked brick, some with [simply] gypsum. Most of the roofs (*saṭḥ*) are covered with pebbles on account of [Ṣan'ā''s] rains.'

Al-Hamdānī, (ob. 330/943) includes several references to Ṣan'ā' houses. One[62] compares high mud towers (*āṭām*) with the dwellings of Ṣan'ā' 'because of their height'. Another[63] refers to excellent sanitation: 'The least dwelling there has a well or two, a garden and long cess-pits separate from each-other, empty of ordure (*adhā*), without smell or evil odours because of the hard concrete (*al-qaḍāḍ al-ṣulb*), and fine pasture land and clean place(s) to walk. A lavatory (*mustarāḥ*) of these passes by inheritance from one to another over the centuries without being uncovered or swept.' The implication is that lavatories do not need to be drained or cleaned.

Al-Rāzī, (ob.460/1073) describes the area around the Jabbānah during the 'Abbāsid rule of Ṣan'ā' (138-248/755-862):[64] 'the houses were upon the road right and left [of the single door of the Jabbānah], stretching up to the sky, with dwelling places and high rooms (*ghuraf*) of the most splendid construction and most beautiful workmanship. They were the most imposing of the dwellings (*manāzil*) of Ṣan'ā'—they were the dwelling places of such governors as came from Iraq, and their entourage of those governors who had accompanied them, along with merchants and men of wealth, substance and easy circumstances who dwelt there. The shade of the *muṣallā* and the Jabbānah came from a shadow extending from those houses upon the right and left because of the height of their ceilings and the loftiness of the building . . . They had fashioned rings of brass[65] like a hollow statue (*timthāl*) in the form of a bull. On each of these doors there was a ring of brass like this statue. When any of them was struck with [the ring] it gave out a sound and a strong echo.'

Of the houses of Ṣan'ā' generally, al-Rāzī says that they were 'tall and imposing and many had high prices'.[66]

Ibn Baṭūṭah, who visited Ṣan'ā', probably in 718/1331, wrote that it was 'a large and well constructed city, built with bricks and plaster'.[67]

The first European visitor to describe the houses was John Jourdain, who in 1609 saw 'many faire houses'.[68] Sir Henry Middleton in 1611 found the town built 'of stone and lime'.[69] Niebuhr described the houses in 1763 using the terms we use

61 Ed. M. J. de Goeje, *Bibliotheca Geographorum Arabicorum*, VII, Leiden, 1892, 109. One should probably understand that the ground floors are sun-dried brick and gypsum.
62 *Ṣifah*, 239-40. See Ibn Qutaybah, *Kitāb al-Shi'r wa-'l-shu'arā'*, ed. de Goeje, Leiden, 1904, 225-6, for a man building an *uṭm* in Ṣan'ā'.
63 *Al-Iklīl VIII*, ed. al-Kirmili, 2.
64 *Tārikh*, 90 seq.
65 Cf. Axum stela.
66 Rāzī, 111-2.
67 *Travels*, trans. H.A.R. Gibb, Cambridge, 1962, II, 371.
68 Cf. p. 108b.
69 Cf. p. 108b.

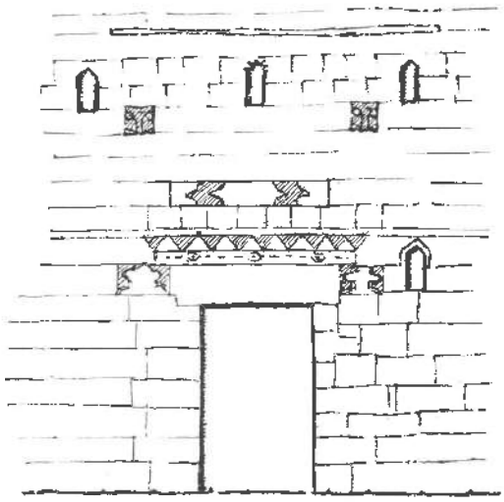
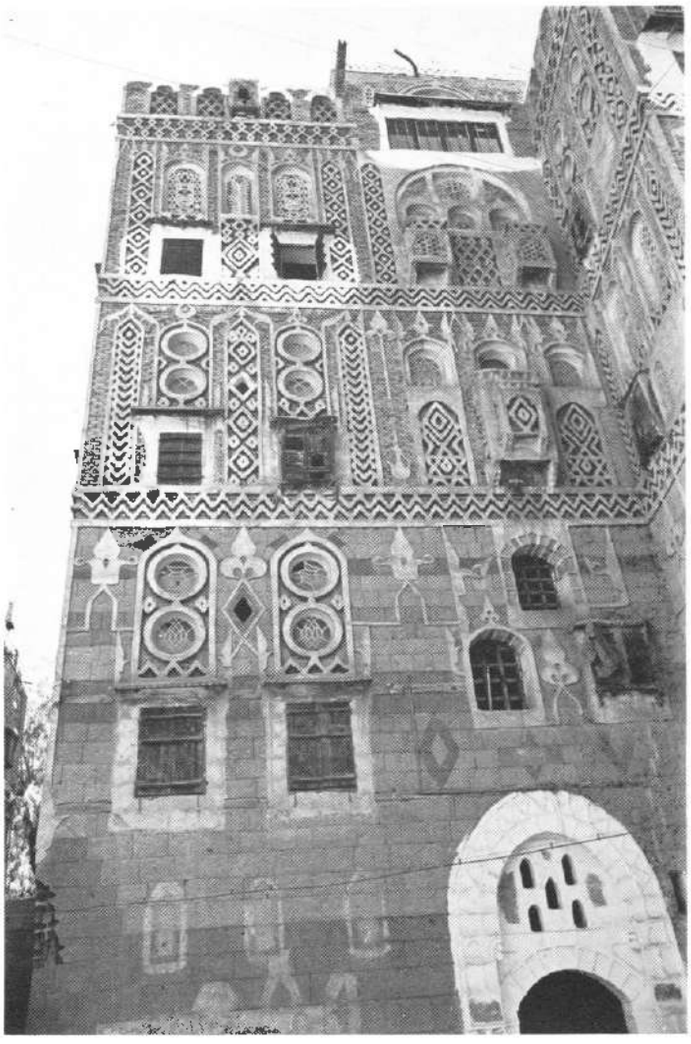
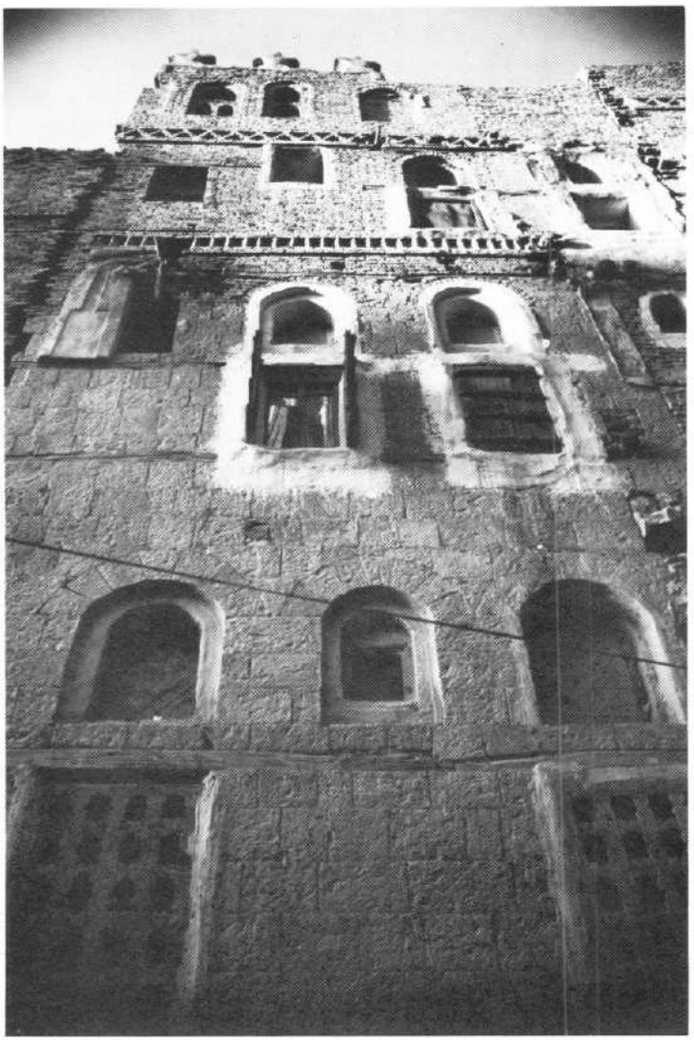


Fig. 22.12 An ancient doorway of a Ṣan'ā' house (Bayt Muṭahhar at Ṭalḥah).

22.131 A house for part of which there is believed to be documentary evidence of an age of six hundred years.



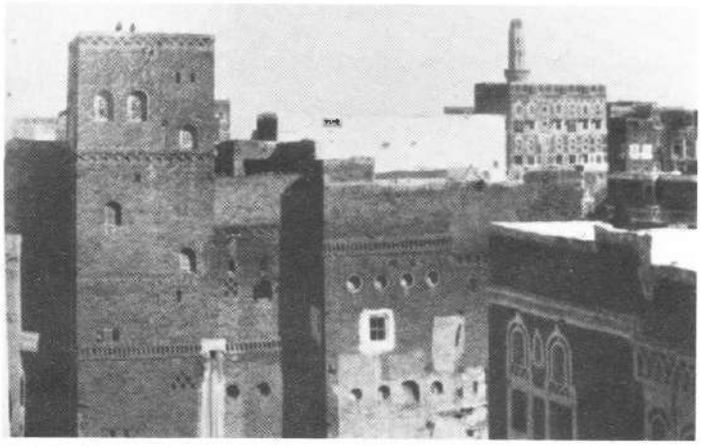
22.130 A decorated house front.



22.132 Windows of an old type in Ṣan'ā'.

today, and published the earliest known illustration of them, a drawing of a house in Bīr al-'Azab which is in the style still in use, with the natural exception of large glass sashes behind the shutters in the upper windows which were introduced within the last century.[70] Cruttenden's drawings of 1836[71] are quite recognisable. The oldest photographs of houses (pls. 10.14-16 and pl. 22.133) show that the general style in use in the late nineteenth century has continued unchanged to the present day, although there were a few ancient houses still surviving then, as is mentioned above.[72] Since the war and Egyptian occupation from 1962-68 there have been many modern innovations, the use of concrete, steel doors, larger windows, a tendency to prefer low villas to the tower houses of the old city, and the use of bright colours in decoration. Nevertheless the old crafts and the traditional building styles retain their popularity and are everywhere still in use.

70 Cf. p. 442a.
71 Cf. p. 111b.
72 Cf. Ibid and pl. 9.5.



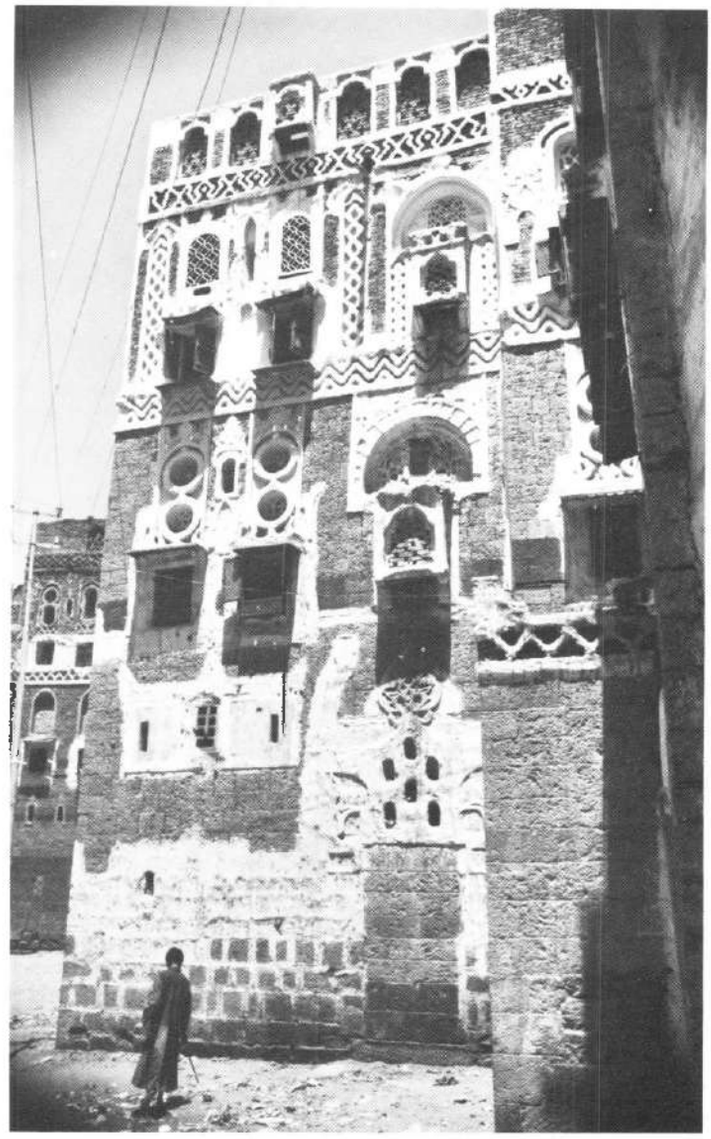
22.133 A Turkish photograph from the late nineteenth century showing a Ṣan'ā' house of an early type which no longer survives. The upper window are single circles of alabaster. (University Library, Istanbul).

22.134 Windows of a type once fashionable contained inside a large arch.

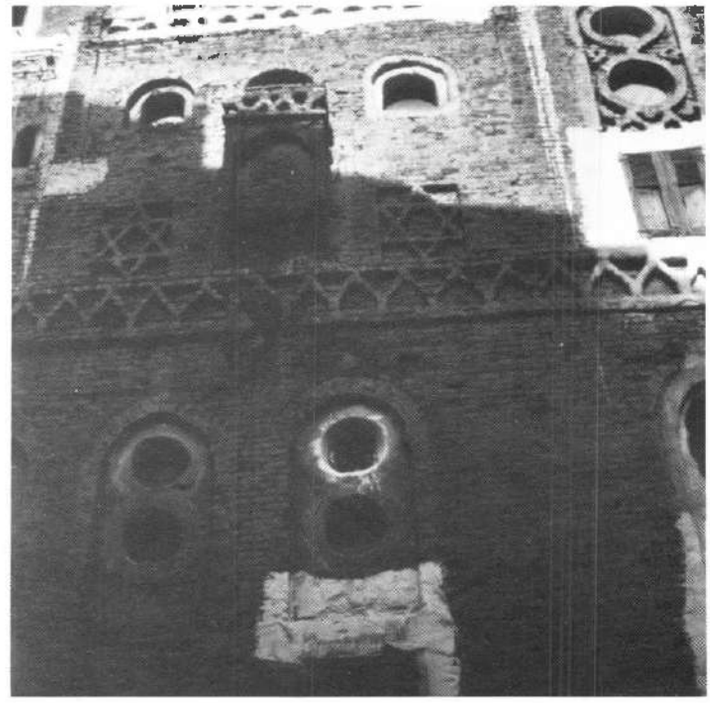
The Origin of the Ṣan'ā' Type of Tower House

The Ṣan'ā' house belongs to a type which does not differ in its essential concepts throughout north and south Yemen,[73] with the exception of the Red Sea coast. In the latter area there are two distinct types of house. One is single storeyed with a front courtyard, conforming to ancient Egyptian, East African, Omani and Persian precedents. The other is high, like the Yemeni house of the highlands, but its construction and pattern of distribution of

73 Cf. Brian Doe and R. B. Serjeant. 'A Fortified Tower-house in Wādī Jirdān (Wāḥidī Sultanate)', *BSOAS*, London 1975, XXXVII, i.



22.135 Large arch fanlights used to light the central lobby on the upper floors of an old house.



22.136 House GI, in Ṣan'ā', believed to be an early seventeeth century Jewish house in the old city.

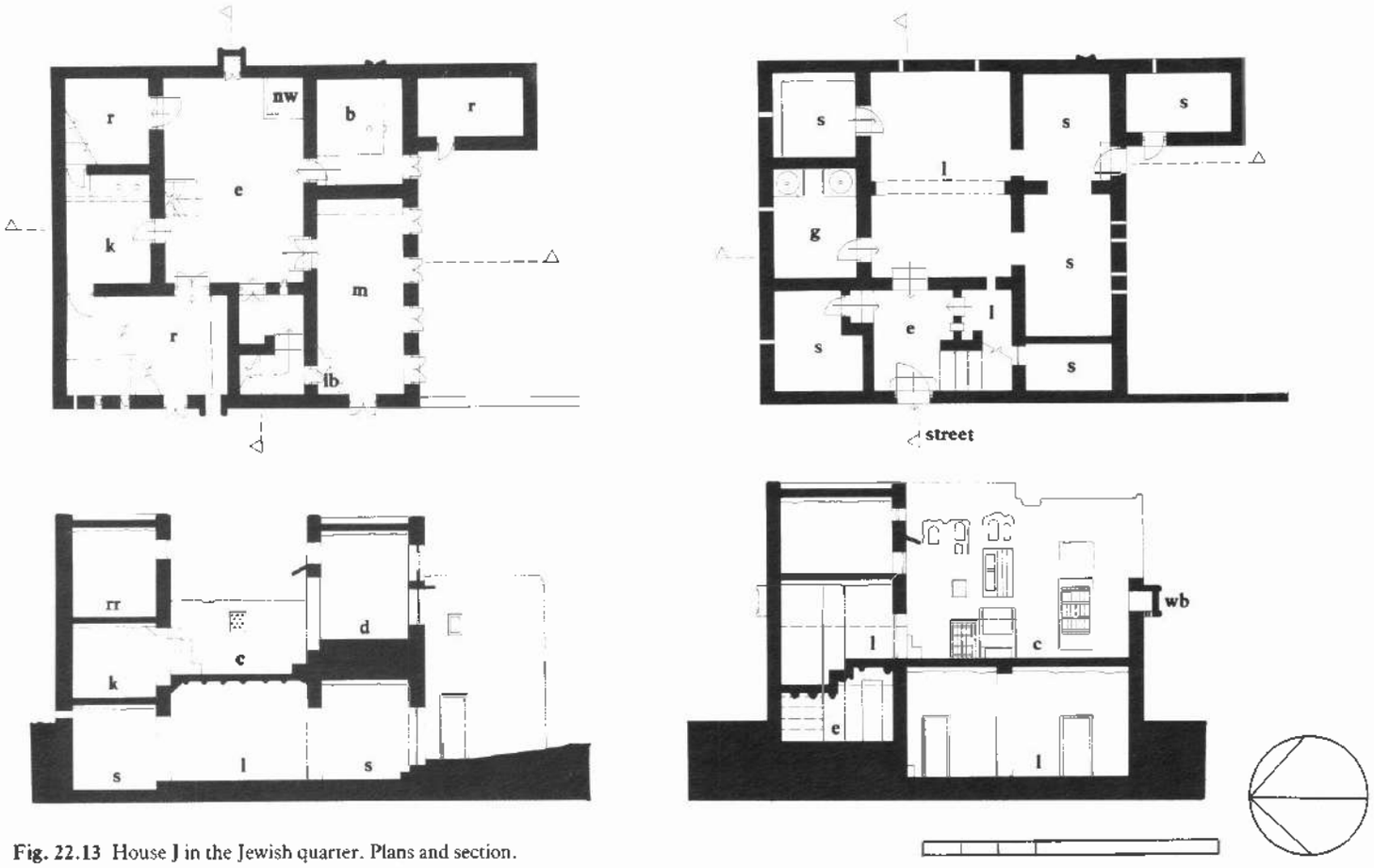


Fig. 22.13 House J in the Jewish quarter. Plans and section.

rooms are sufficiently different to allow us to consider it as a separate type. It belongs to the world of the Red Sea trading cities, ultimately linking up with the houses of Mecca and Medina through Jeddah; this type also occurs on the other side of the Red Sea, in such towns as Suakin/Sawākin.[74]

The houses of the Yemeni highlands extend further north to include the areas that were anciently part of the Yemen, particularly Najrān. Here, although there are minor differences, the concept of the house is essentially identical with that of Ṣan'ā'. In the northern Hijaz the Yemeni pattern of living does not occur, although the houses are still high square blocks without proper courtyards; it is possible that in the remote past the two types of house shared a common ancestor.

It is abundantly clear that the Yemeni highland house has no links at all with courtyard houses of ancient type, which occurred in antiquity in basically the same form from Spain and Morocco to Mesopotamia.

The Yemen highland house therefore appears unique, a product of Arabia and probably of South Arabia itself.

The only qualification which needs be made to this statement is that, since ordinary houses are usually stylistically the descendants of the palaces of a preceding generation, there may prove to have been some mutual interaction between the ancient palaces of the Axumite empire in Ethiopia and those of Southern Arabia, a problem that awaits further archaeological excavation in both countries.

The earliest staircases designed as a series of straight flights around a square central pillar are always assumed by architectural historians to be those of the Nabateans, in their early temples and tombs in Palestine.[75] The staircases of later buildings in the Mediterranean were evolved from these. Future archaeological excavation may demonstrate whether the Nabatean staircase owed its origin in turn to Southern Arabia, as seems possible, or whether the influence was in the reverse direction.

Ancient Persian influence in Yemeni house design, dating back to the period of Persian rule in the Yemen immediately before the acceptance of Islam, seems unlikely to have been very profound. However, it was a traditional Zoroastrian practice to treat the entrance hall as a transitional zone, with a double set of doors for protection, one on the outer street side, and the other door at the entrance to the house proper.[76] The older Ṣan'ā' houses seem to preserve something of such an idea in the strong opening through which one has to pass into the staircase. Often this has its own lockable door (e.g. pl. 22.84).

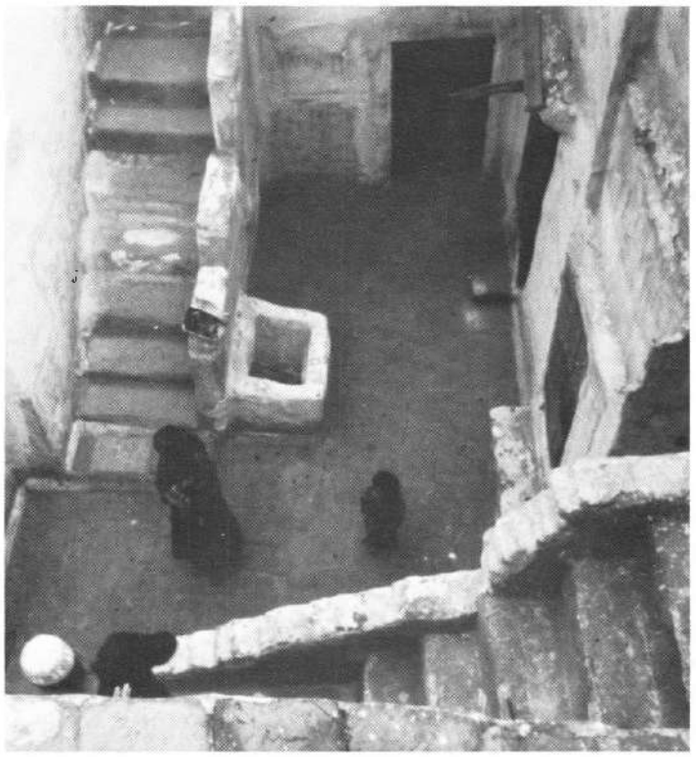
Traditional aspects of Yemeni houses which distinguish them are, besides their height and the absence of courtyards, their tendency to strict symmetry in plan and elevation, and the high quality of their construction, their finishes, and their maintenance.

The pattern of use of a Yemeni house testifies to the strength of the family and the clan in Yemeni life, for the retention of a large room (the *dīwān*) for all important events affecting the family—childbirth, marriage, pilgrimage celebrations, and the laying out of the dead, is extremely rare elsewhere in the Islamic world.

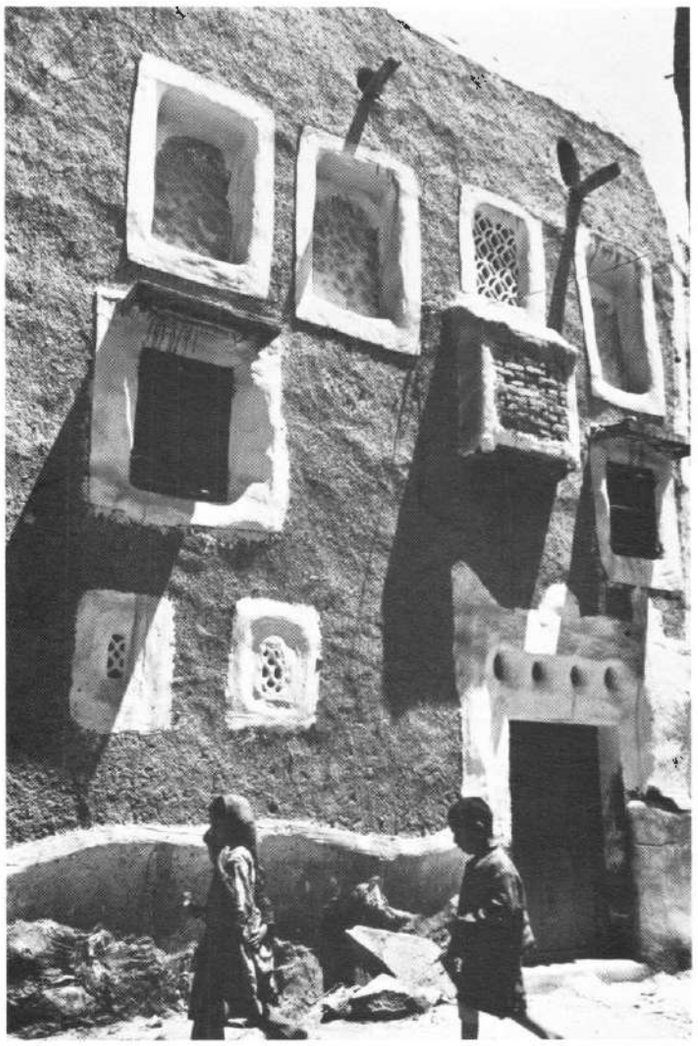
The Jewish House

There were large numbers of Jews living in the Yemen from the pre-Islamic era. At the time of the emigration of 1949 to 1950 they constituted roughly a fifth of the population of Ṣan'ā', dwelling in al-Qā' to the west of Bīr al-'Azab, but largely working during the daytime in the old city as craftsmen, merchants or builders.

74 Jean-Pierre Greenlaw, *The coral buildings of Suakin*, London, 1976.
75 Temple of Allāt at Rām, mid 2nd c. A.D., temples at Gerasa, theatre and baths at Philippopolis.
76 Sir H.W. Bailey, personal communication.
77 Cf. p. 391.



22.137 House GI. The courtyard.



22.138 House J in the Jewish quarter. Exterior.

77 See chap. 20.

22.139 House J in the Jewish Quarter. Courtyard, south west corner.

The history of the Jews in Ṣan'ā' has already been studied.[77] They appear to have lived unsegregated from Muslims throughout the old city until in 1066/1679 they were moved away to near the Red Sea coast. A year or so later they were permitted to return to Ṣan'ā' though no longer to dwell within the old walls, but instead, they were allowed to settle next to the Bawniyah quarter, which seems to have been a village already established for more than a century. The area of al-Qā' built up by them soon had its own narrow sūq and, in 1906, more than thirty synagogues.[78]

Before the Jews emigrated from Ṣan'ā' their houses were visited and studied by a number of scholars, which resulted in the publication in 1957 of *Jewish Domestic Architecture in Ṣan'ā', Yemen* by Carl Rathjens.[79] Subsequently, the son of the Chief Rabbi of Yemen, Joseph Qāfiḥ, published in Hebrew, *Jewish Life in Ṣan'ā'*.[80]

As the Jews left, their houses were taken over by Muslims, who usually proceeded to live in them making only the most minor changes. Thus it is possible to study many of the houses today, measuring them, and producing accurate plans and sections for the first time. This work also enables some conclusions to be reached which differ slightly from those of the earlier studies.

House J (fig. 22.13; pls. 22.138-42) is a relatively small house in a street close to the centre of al-Qā'. It does not differ in any substantial way from the largest houses of the quarter, which simply proliferate the number of rooms and apartments, and have a larger courtyard or courtyards to make this possible.

The essential difference between the Jewish house and the Islamic house was that the former had as its focus a courtyard from which all the main rooms opened on the roof. A second peculiarity was the Jewish practice of arranging the rooms around the courtyard so that two were seldom on the same level, the principal entertaining room being highest, the *dīwān* next, and so on downwards until the kitchen was below the level of the courtyard and the lavatory lower still. This involved small flights of stairs before each doorway leading up or down.

The explanations given for both these features are religious. The need for a courtyard was explained to Goitein: 'According to strict Jewish law, during the Feast of Tabernacles, celebrated for seven days in September-October, a man should not only take all his meals in a room covered only with branches of a tree or similar light material, but also sleep in it.' The courtyard made possible

78 Brauer, *Jemenitische Juden*, 306 seq., gives a list of twenty-four synagogues.
79 Jerusalem, 1957.
80 Jerusalem, 1966.

22.140 House J in the Jewish Quarter. Courtyard, north west corner.

this temporary construction, but Goitein adds, 'in order that the light material covering the tabernacle should not be blown away by the winds', one had to build a screen wall around the courtyard, called a *kuwwābah*.[81] The screen wall was sometimes pierced with a projecting masonry box for water jars, and even by areas of gypsum tracery contained in arches.

The hierarchy of levels around the courtyard probably has something to do with the first explanation. That is, as the courtyard served to house the tabernacle during a brief period each year, it became a sacred place for that time,[82] and no room could be exactly on a level with it. In particular the lavatory and bathroom had to be below it, as they were in the synagogue. The extra height given to the entertaining room is due to the necessity of giving it a view.[83]

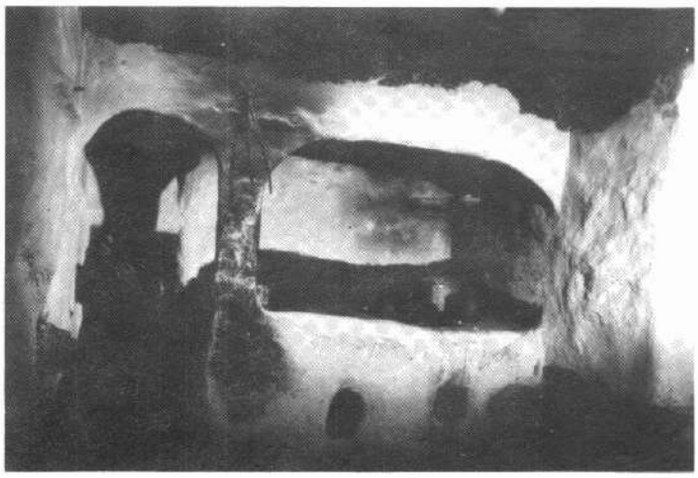
The front door openings of Jewish houses are usually simple rectangular constructions in large blocks of stone, like the oldest houses in the old city. Jewish door knockers are frequently like Islamic ones, but there is also the use of a ring as a knocker, recalling the type mentioned by the historians (p. 493).

House J has a single door from the street into a stone-paved lobby which has two short flights of stairs down to right and left into stables; also on the right is the long flight leading upstairs while straight ahead is a short flight leading down to the lowered ground floor under the courtyard and the rooms on either side of it.

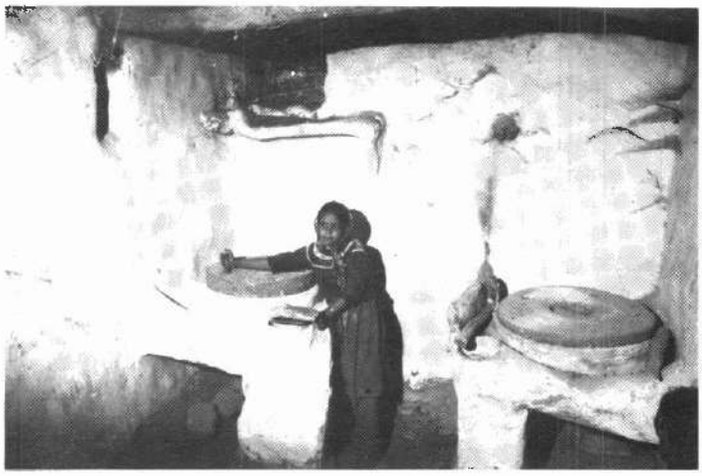
Entering the large open central space of the lowered ground floor, there is a room containing stone hand-mills raised on stone sockets on the left, a second storeroom with shelves next to it, while on the right there are two storerooms, through one of which one enters the garden which adjoins the house;[84] the latter was probably the workshop of the Jewish house. A third room is entered only from the garden, and was once perhaps the room used by the Jews for the distillation of brandy.[85]

Above, the staircase disgorges onto the open courtyard (*ḥijrah*). On the right (south) a short flight of three steps leads up to *al-makān al-kabīr,* the equivalent of the Islamic *dīwān* in both design and function. This Jewish room differs from the *dīwān* only in occasionally having a raised masonry bench at one end, a *īwān*.[86] Next to this room on the right in house J is a low bathroom (with-

81 Ibid, 6.
82 The Jews from Yemen continue this practice to this day. This information and the translation of Joseph Qāfiḥ's *Jewish Life in Ṣan'ā'*.
83 The explanation given for this feature by Rathjens (p. 14) does not conform with the houses studied here.
84 There is an unaccounted for space between the ceiling of this storeroom and the floor of the large room above. Such spaces were kept by the Jews as low storage-places entered through a hole in the ceiling which was afterwards plastered over. Cf. Rathjens, op. cit., and Qāfiḥ, op. cit. Similar hiding places for valuable goods were sometimes built into Islamic houses.
85 Cf. Rathjens and Goitein, op. cit., 24, n. 14.
86 Cf. p. 455a.



22.141 House J in the Jewish Quarter. Kitchen.



22.142 House J in the Jewish Quarter. Grinding mills on the lower level.

out a lavatory) which is down two steps.

On the other side of the courtyard, the left (north), there is the main reception room, raised so that it has to be approached up a flight of five steps. Under it is a kitchen, entered by descending two steps. Further away (east) there is a small room for general use, two steps above the courtyard.

On the same side of the courtyard as the staircase (west) there is a second living room three steps up, with a scullery (*sāḥil*) underneath for washing dishes: the latter is entered from the kitchen. Entered from the other side of the kitchen, and placed under the small courtyard room, is a storeroom without windows, used as a larder.

The floors of the main rooms in a Jewish house were made of a beaten bed of clay and pebbles (*qaḍāḍ*), and not generally of the stone paving used in Islamic houses.

Frequently the doors opening from the courtyard have a small timber ledge above them to shed the rain.

The open courtyard has a drained floor on the south east corner for washing clothes, dishes and, on sunny days, even small children. It is screened from its neighbours and the wind by a high wall penetrated by a masonry cooling box for water jars. Warm water for washing was obtained by the Jews by leaving water in big brass bowls standing in the sun.[87] There were usually aromatic plants growing in pots along the screen wall.

The lavatory is not, in this house, approached from the courtyard, which it is in many other cases, but from a landing half way up the staircase; this takes it even further than usual below courtyard level.

The Jewish houses of al-Qā' are not built of squared ashlar stonework and baked brick, but of the common rural building materials, rubble stonework, unbaked brick and coursed clay. These materials are usually plastered over with clay plaster reinforced with chaff or an admixture of animal dung. This surface looks very fine indeed as long as it is annually renewed, and has the advantage that it forms an impervious skin over everything underlying it. So these materials, with translucent alabaster panels set into them for windows (pl. 22.138) may not necessarily have been used in al-Qā' because the Jews were uncertain whether they might be moved out again and lose almost everything, as had happened in 1066/1679. Instead, they may have been chosen because they had discovered the technique of building with them to be economical and structurally superior to the stone and baked brick of Ṣan'ā', at least in low buildings. The houses in the old city that seem to have been Jewish houses before 1066/1679 are much closer to the Islamic houses both in height and building materials.

87 In Ḥaḍramawt also, for example in Tarim, water for culinary and other purposes was placed on the roof in aluminium *dusts* to heat and thereby economise in fuel. Water so heated quickly boiled over a light fire of palm leaf (*sa'f*).

The Jewish houses of al-Qā' are much lower than Islamic houses in accordance with the sumptuary regulations of Islamic South Arabia.[88] True, there is a record that the houses were originally higher in al-Qā' and were reduced by edict of the Imām;[89] no doubt they were. But they were also larger in plan than they had ever been able to be in the press of the old city, for at least hundreds of years before. The advantage of the increased size of the plan, of course, was that more living rooms were able to be grouped around the courtyard. As this also increased the area available for storerooms and stables underneath, the mezzanine could be eliminated. Thus the height of the house could be reduced from four levels to two, with great increase in amenity. If a rich man could acquire a larger site, or join two houses together, as often seems to have happened, then he could continue to increase the accommodation without going upwards, something that could not easily be done in the Islamic house with its more rigid concept of grouping rooms around a single staircase instead of around large and flexible courtyards.

This seems borne out by the few remaining Jewish houses in the old city. They are higher, built of ashlar stone and baked brick, with the courtyard at the third level. Although they were subsequently altered, it is possible to see that, as the courtyards were smaller, the living rooms were grouped around them on two levels, and this necessitated several separate staircases which climbed more than the height of a storey to reach the rooms they served (pl. 22.137). There are similar Jewish houses, apparently dating from medieval times, preserved at Thulā.

Finally, the origin of the Jewish house in Ṣan'ā' does not seem to link, as Rathjens postulated, with courtyard houses of Mediterranean type, nor with a hypothetical courtyard house in pre-Islamic South Arabia, of which there is as yet no evidence. It seems, instead, to be an adaptation of the indigenous Yemeni house to Jewish needs, or at most a fusion, probably before Islam, of Jewish living concepts from the north with ancient local traditions of construction and dwelling.

To convince ourselves of this it is only necessary to examine what happened to the Mediterranean courtyard house when the shortage of space forced buildings upwards in Cairo during the Middle Ages.

The concept of the Mediterranean urban house is that the rooms look inward to the courtyard (Greek houses at Priene, Pergamon, Delos, etc., and the Roman *domus* at Pompeii, Herculaneum, etc.). The essential difference between the Jewish house in Ṣan'ā' and the Cairo house is that in the latter the courtyard remained the visual focus of the house. In particular, there is an

88 Brauer, *Jemenitische Juden*, 269. Fourteen prohibitions are listed including 'Construire de maisons plus hautes que les maisons des musulmans.'

89 Niebuhr, *Reisebeschreibung*, 1774, 422: *Description*, I, 336, no Jew was allowed to build over 14 *coudées*/*dhirā'* in height.

open loggia, now on a higher level, looking down into the courtyard. But in house J in Ṣan'ā', in this respect typical of the Jewish houses there, there is no centralized visual focus in the courtyard. On the contrary the rooms look outwards, the *dīwān* looking at other houses across its garden, the *manẓar* at other houses across the rooftops, exactly as happens in the Islamic houses of Ṣan'ā'.

Fig. 22.14 Houses MM and B. Elevations.